Methodology Report

Hampton Roads Transportation Planning Organization

Program Priorities

Prepared for: Hampton Roads TPO Transportation Planning Organization; VDOT Virginia Department of Transportation

Prepared by: Kimley-Horn and Associates, Inc.

July 2010

HAMPTON ROADS TRANSPORTATION PLANNING ORGANIZATION PROGRAM PRIORITIES METHODOLOGY REPORT

Prepared in cooperation with the U.S. Department of Transportation (USDOT), the Federal Highway Administration (FHWA), and the Virginia Department of Transportation (VDOT). The contents of this report reflect the views of the Hampton Roads Transportation Planning Organization (HRTPO). The HRTPO is responsible for the facts and the accuracy of the data presented herein. The contents do not necessarily reflect the official view or policies of the FHWA, or VDOT. This report does not constitute a standard, specification, or regulation.

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July 2010

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Executive Summary

Background

It has always been challenging for policy makers to allocate limited funding sources to the transportation improvement projects proposed in the Hampton Roads Long-Range Transportation Plan (LRTP), especially in recent years. Since federal law requires that regional plans be financially constrained, policy makers endeavor to consider only the most viable projects which will provide the optimum utility to the entire region and impact regional economic growth. A project's utility considers the project's ability to solve an existing transportation issue, which could be associated with congestion, safety, infrastructure condition, or ridership, while a project's viability level indicates the readiness of the project to be constructed based on available funding and completion of regulatory documentation. A third component is economic vitality, which considers a project's ability to impact regional economic growth through increased capacity and/or increased opportunity. Therefore, it is advantageous for policy makers to have the ability to develop an overall Project Prioritization process using information relative to all three project traits—utility, viability, and economic vitality.

The current 2030 LRTP consists of almost 100 projects requiring approximately $12 billion of funding; however, only a select number of projects tied to two specific funding streams are prioritized and ranked. Without a prioritization methodology in place for other funding streams, all other planned projects are viewed as being equal in importance and part of a system-wide improvement strategy. With declining revenues, there needs to be a prioritization process put in place to compare benefits of similar potential project types amongst each other. There is no longer funding available for a system-wide improvement strategy.

In order to obtain consensus-based support for regionally beneficial projects, planning officials must evaluate factors such as costs, benefits, project readiness, and the impact of a project on the region's economic growth to determine the relative priority of individual projects. When combined with a project's technical merit, these additional factors help policy makers to select projects which will form a solid transportation plan that addresses the key needs of the area with the recognition of limited funding. The Hampton Roads Transportation Planning Organization (HRTPO) sought to develop a process by which policy makers are given an initial scoring system to help make informed decisions on how to efficiently identify the most beneficial, practical, and feasible future LRTP projects. This document provides an overview of this process, herein identified as the Program Prioritization Process.

Kimley-Horn and Associates, Inc. (Kimley-Horn) was commissioned in July 2009, through its on-call contract with the Virginia Department of Transportation's (VDOT) Transportation and Mobility Planning Division, to assist the HRTPO with developing a living process and methodology that provides insight into the utility and viability of future regional projects. This document outlines the development of this overall process, which is in the form of a scoring tool. The eight SAFETEA-LU (Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users) Federal Planning Factors were addressed when developing this methodology to ensure consistency with federal guidelines.

To assist Kimley-Horn, a Program Prioritization Steering Committee (Steering Committee) consisting of Kimley-Horn and a select number of members from the Transportation Technical Advisory Committee (TTAC), including representatives from VDOT, Hampton Roads Transit (HRT), Williamsburg Area Transit Authority (WATA), branches of the United States Military, Virginia Port Authority (VPA), and each of the Hampton Roads localities, was assembled. The Steering Committee convened multiple times between July and December of 2009 to develop, validate, and refine the Program Prioritization Process. Additionally, during each month between September and December 2009, presentations were made to both the TTAC and HRTPO Board to provide updates on the project status and to obtain their endorsement on the progress to date.

Methodology

Understanding that funding sources are often specific to certain project types, the first task in the development of the Program Prioritization Process was to establish a set of groups or categories to evaluate similar projects separately. It was acknowledged that comparisons should only be made between similar projects, allowing consideration of unique categories and specific attributes. Within each of the categories, specific utility, viability, and economic vitality criteria pertinent to that category were developed as applicable. Six categories were established based on a review of benchmark agencies and numerous discussions with the Steering Committee, TTAC, and HRTPO Board. These categories included the following: "Highways," "Bridge/Tunnel," "Bicycle and Pedestrian," "Systems Management/Transportation Demand Management/ Operational Improvements," "Transit," and "Intermodal."

Within each category, the Steering Committee was challenged with determining the appropriate number of criteria to find a balance between ensuring that all important aspects of each project category were being considered in the scoring while avoiding having too many criteria, which could reduce or dilute the significance of any one. Additionally, it was essential to ensure that all criteria addressed the requirements outlined in the eight SAFETEA-LU Federal Planning Factors. Within each category, numerous criteria accounted for the utility of a project while several other criteria captured project viability. For four of the six project categories, additional criteria were established to account for economic vitality. A detailed explanation of each evaluation criterion is included in Chapter 4.

After establishing the appropriate categories and evaluation criteria, the next step was to develop proposed weighting factors for each criterion. Understanding that these weights are subjective in nature, it is anticipated that they may be modified in the future to address different regional priorities. The weighting process was based on an independent, 100-point cumulative scale for each trait (project utility, project viability, and economic vitality) within each category. With this process, each project would start with zero points and then be awarded points from each evaluation criterion up to a maximum of 100 points for each traits. Because the scale is out of 100 points, each evaluation criterion's point value is equivalent to its weighting percentage.

To assist the Steering Committee in developing initial weighting factors, a survey process was used to gather input from the Steering Committee, TTAC, HRTPO Board, and general public. Both technical and non-technical stakeholders were surveyed using an online survey site to receive input. Two separate versions of the survey were administered: a technical version for Steering Committee and TTAC members and a public version for the general public and elected officials. Both versions required detailed input on the categories and primary criteria while the technical version required additional detailed input on the subcriteria. From the survey results, weighting factors were established and refined iteratively through multiple meetings with the Steering Committee, TTAC, Transportation Advisory Committee (TAC), and HRTPO Board. As noted frequently within this document, the refinement process will continue throughout the life of this project as regional visions, priorities, and individual characteristics of the projects being evaluated change and evolve.

Concurrent with the weighting factor development was the measure of effectiveness (MOE) development. MOEs are a key component of the project scoring process and are the foundation for determining scores for the three utility, viability, and economic vitality measures of a project. When selecting an appropriate MOE for each individual evaluation criterion, the metric should be measureable and able to capture a project's fulfillment of the evaluation criterion (e.g., volume to capacity ratios measure congestion while crash rates measure safety).

In this methodology, MOEs for the project utility and project viability evaluation criteria were developed through numerous meetings with VDOT, Kimley-Horn, and the Steering Committee. Specific MOEs for the economic vitality evaluation criteria were developed by HRTPO staff, in consultation with the Steering Committee, the Port of Virginia, HRT, WATA, TTAC, and Freight Technical Advisory Committee. All MOEs were classified as being either obtained, calculated (from other obtained parameters), multiple choice (e.g., high/medium/low, etc.), or either/or response format (e.g., yes/no).

Project Timeline

During the initial development of the prioritization process during July through December 2009, one individual score was assigned to each project inclusive of all three traits (utility, viability, and economic vitality). Project viability and economic vitality were considered incorporated as part of the multiple evaluation criteria under each project category. Under this one-part process, the maximum weighting factor assigned to the project viability or economic vitality criterion was 10 percent. Because top projects under the one-part approach received scores in the mid to upper 70s, a project could have received zero of the ten points under project viability or economic vitality and still have been considered a top project.

In November 2009, members of the TTAC, TAC, and HRTPO Board suggested that a project's utility and viability be evaluated separately, recognizing that each trait has a separate importance depending on which question the user is trying to answer. A project high in both utility and viability is more likely to receive consensus-based support for funding than a project high in utility but low in viability. When developing an LRTP with a 20-year horizon, a project's utility is paramount; however, to maximize the use of current funding opportunities, project viability takes on greater importance. Therefore, a two-part

scoring process considering project utility and project viability separately would clearly provide delineation between both of these pieces of information. With the support of the Steering Committee, the process was updated and finalized in January 2010 to consider project viability as a standalone scoring indicator by which a project is evaluated based on its current level of funding, phase of the planning process, backing by federal mandates, and readiness of construction. This two-part process still included economic vitality as one of several criteria under project utility.

At subsequent meetings of the TTAC, TAC, and HRTPO Board in early spring 2010, it was further determined that economic vitality also should be evaluated separately, again understanding the crucial nature of identifying high impact projects with the ability not only to solve existing transportation problems but also to support economic enhancements to the region. HRTPO staff conducted extensive economic research and determined evaluation criteria and weighting factors to evaluate economic vitality for the four project categories which considered economic vitality. This report documents the updated methodology of a three-part scoring process which provides policy makers with three distinct pieces of information—project utility, project viability, and economic vitality. Each of the three traits uses a separate, 100-point cumulative scale; however, the totals are independent of each other and are not added together. To reduce the potential for users to combine the three traits into one score, letter grades were assigned to the project viability and economic vitality values, with A/B projects being easily implementable or highly supportive of economic growth while D/E projects are much less viable in the immediate term or provide little support for economic growth. This configuration provides policy makers with a parallel analysis by which they can evaluate how viable projects with high utility scores actually are and how they support the economic growth of the region.

As the process and application have evolved over the past year, it has been acknowledged that the methodology presented in this document will serve as a solid foundation to further refinements, as needed. This document is designed to be a living methodology generated by consensus-based decisions made relative to the current environment and regional vision. Recognizing that the future will bring changes to how projects are planned and funded, this methodology provides the flexibility to be updated and modified as needed to accommodate the most current process. Similarly, a project scoring tool was designed to readily accommodate future updates easily and efficiently.

Project Tool

The categories, evaluation criteria, weighting factors, and MOEs comprise the necessary components of the prioritization methodology. In conjunction with the development of the methodology, a Program Prioritization tool was developed. The goals of the Program Prioritization tool include providing a convenient, interactive, user-friendly, simple, and versatile method to score and sort projects, while providing users with a variety of information to aid in the funding decisions of the financially constrained LRTP.

The tool was developed in an electronic spreadsheet (Excel) format with Visual Basic Macro programs in order to take advantage of a widely used format with which multiple users are familiar. The tool was set

up to allow users to easily modify project weighting factors through an interactive system which updates results instantaneously. The tool is versatile in that it allows for a more detailed output of "Highways" or "Bridge/Tunnel" projects being sorted by individual criteria or by their associated roadway system. Technical scores are tabulated for each project using available background information, evaluation criteria, and associated weighting factors established through benchmark agency research, input from technical and public surveys, and meetings with the Steering Committee, TAC, TTAC, and HRTPO Board.

To test the validity of the prioritization tool's process and structure, an initial tool validation analysis was performed at the completion of the two-step methodology which included the separate project utility and project viability components. The tool validation analysis was performed on a sampling of 41 initial projects spanning all six project categories. The projects included both regionally significant mega projects such as the Hampton Roads Bridge-Tunnel and the Widening of I-64 (Southside and Peninsula) and local/multijurisdictional projects including minor road widening and bike paths. There are three main steps in the tool validation analysis, as illustrated in **Figure ES-1**.

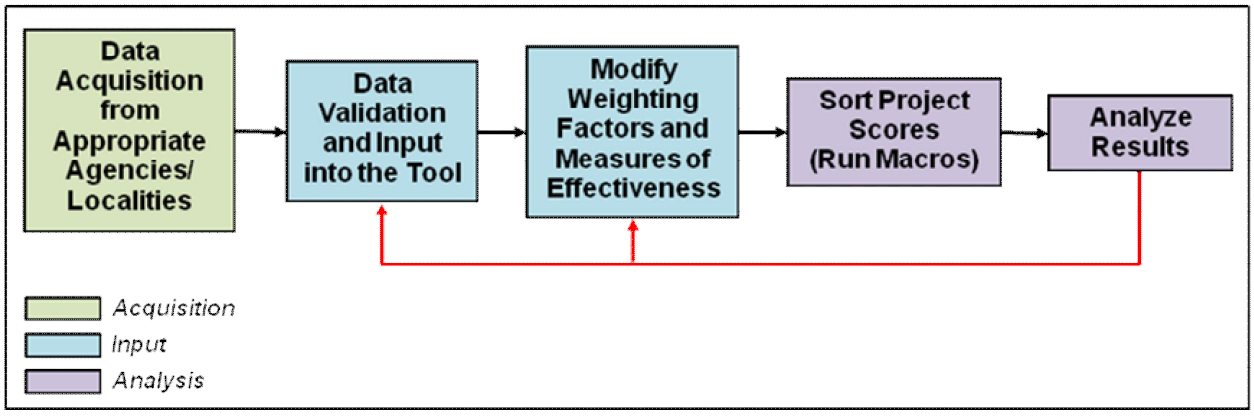

Figure ES-1 Tool Application Flow Chart

Revision efforts will still be an ongoing task after the project tool has been handed to the HRTPO for use in developing the 2034 LRTP. Further refinements may still be needed to align project-specific funding sources with the six categories, find an appropriate way to capture *Cost Effectiveness* for "Intermodal" projects, and better quantify project viability. The tool and methodology should be reviewed and reevaluated concurrent with the development of each LRTP update. When reevaluating the methodology and tool, the vision and goals of the region should serve as the benchmark for any modifications. If modifications are deemed necessary, the proposed revisions should be presented to and endorsed by the HRTPO Board prior to inclusion.

1. Introduction

Detailed planning processes are essential in building a consensus-based vision for long-range transportation needs of the Hampton Roads region. These processes outline how factors such as congestion, safety, infrastructure condition, and ridership are considered when establishing the vision. In identifying meaningful projects, planning officials must evaluate factors such as costs, benefits, and project readiness to determine the priority of individual projects. These technical evaluations are necessary when endeavoring to plan a solid transportation network which addresses the key needs of the area with the recognition of limited funding. This challenge necessitates a methodology to help compare benefits of similar potential projects amongst each other. Kimley-Horn and Associates, Inc. (Kimley-Horn) was commissioned in July 2009, through its on-call contract with the Virginia Department of Transportation's (VDOT) Transportation and Mobility Planning Division, to assist the Hampton Roads Transportation Planning Organization (HRTPO) with the development of a living process and methodology that provides insight into the utility, viability, and economic vitality of future regional projects. A project's utility considers the project's ability to solve an existing transportation issue, which could be correlated to congestion, safety, infrastructure condition, or ridership, while a project's viability level indicates the readiness of the project to be constructed based on available funding and completion of regulatory documentation. The third component of the three-legged stool of prioritization is economic vitality, which considers a project's ability to impact regional economic growth through increased capacity and/or increased opportunity.

1.1 Background

The HRTPO is the body comprised of the Hampton Roads localities and appropriate state and federal agencies to perform the duties of a Metropolitan Planning Organization (MPO) under stipulated federal regulations. Membership consists of both voting and non-voting representatives. Voting members consist of a representative from each locality, Williamsburg Area Transit Authority (WATA), Transportation District Commission of Hampton Roads [the governing board of Hampton Roads Transit (HRT)], VDOT, Virginia Department of Rail and Public Transportation (DRPT), Virginia Port Authority (VPA), and four General Assembly Representatives (two senators and two delegates). Non-voting members consist of a representative from the Virginia Department of Aviation, Federal Transit Administration (FTA), Federal Highway Administration (FHWA), Federal Aviation Administration (FAA), Peninsula Airport Commission (PAC), Norfolk Airport Authority (NAA), Chief Administrative Officers for all member localities, Chair of the Citizens Transportation Advisory Committee (CTAC), and the Chair of the Freight Transportation Advisory Committee (FTAC). Military participation and input also are encouraged at HRTPO meetings; however, formal votes are not allocated to the representatives in attendance. Mandatory qualifications necessary for each member type, in addition to alternate eligibility, are contained within the *HRTPO Bylaws*.

The HRTPO has the primary responsibility in developing the regional Long-Range Transportation Plan (LRTP). The current 2030 LRTP consists of almost 100 projects requiring approximately $12 billion of funding; however, only a select number of projects tied to two specific funding streams are prioritized and ranked. Without a prioritization methodology in place for other funding streams, all other planned projects are viewed as being equal in importance and part of a system-wide improvement strategy. The HRTPO is seeking to establish an improved methodology and related tool which can apply a weighted set of performance measures to each project within the future LRTP and provide policy makers with an initial scoring system to help make informed decisions on how to efficiently distribute limited federal, state, and local funds.

1.2 Project Purpose and Objectives

The purpose of this project is to develop a process by which policy makers are given a set of objective measures to identify the most practical and feasible future LRTP projects. All identified projects are intended to maximize the opportunity to optimally use federal and state transportation funding within the Hampton Roads transportation network, which is consistent with VDOT's current programming strategy. This document outlines the development of this overall process, which is in the form of a scoring tool. The eight Federal Planning Factors[1] were addressed when developing this methodology to ensure consistency with federal guidelines. While it is anticipated that the initial application will be used to develop the regional 2034 LRTP update, the methodology may be applied for interim decisions such as the recent stimulus funding opportunities. This document is designed to be a living methodology generated by consensus-based decisions made relative to the current environment and regional vision. Recognizing that

[1] As documented in 23 CFR 450.306(a)

the future will bring changes to how projects are planned and funded, this methodology provides the flexibility to be updated and modified as needed to accommodate the most current process.

As illustrated in **Figure 1**, there are three distinct components of the developed Program Prioritization Process: Project Scoring Tool, Project Ranking, and Project Priority List. The methodology presented throughout this document focuses primarily on the Project Scoring Tool and a small portion of the Project Ranking (preliminary ranking of a selection of tool validation projects).

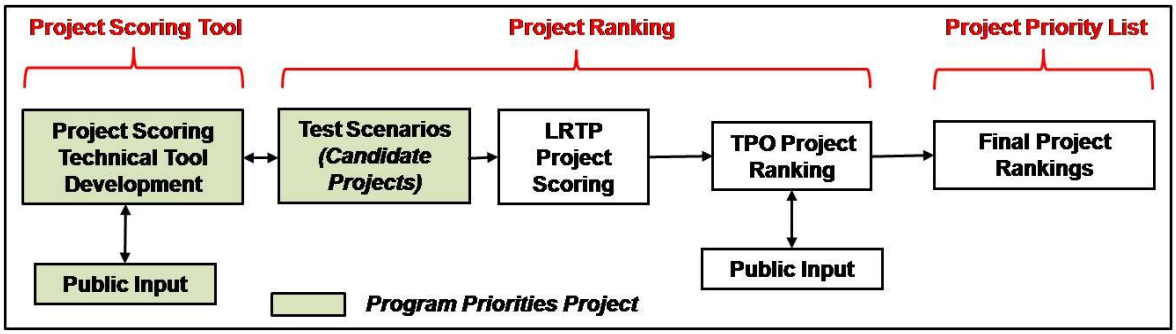

Figure 1 - Program Prioritization Process

The Project Scoring Technical Tool Development consisted of developing a consensus-based living methodology (and tool) which ultimately scores projects on their distinct utility, viability, and economic vitality traits. Input from both technical [Transportation Technical Advisory Committee (TTAC)] and non-technical (HRTPO Board and general public) bodies were received throughout the development of the Project Scoring Tool component, including the development of project categories, evaluation criteria, and weighting factors.

Upon completion of developing the project scoring tool, an initial project ranking phase began. During this phase, a tool validation analysis was completed for a sampling of projects considering the project utility and project viability components. The purpose of completing this tool validation analysis was to assess the tool's validity, explore the potential measures of effectiveness (MOEs), determine any associated data availability issues, and evaluate how effective the inputs (evaluation criteria, weighting factors, and MOEs) for project utility and project viability were at producing reasonable results. It is essential to understand that this report's objective is to provide a very efficient and valid first attempt at a highly iterative process. Input of additional projects and further refinement of data, weighting factors, and MOEs will be necessary hereafter to further refine the project ranking tool. Further refinements will be the responsibility of HRTPO staff, in coordination with their member agencies.

To ensure a broader range of input beyond VDOT, Kimley-Horn, and HRTPO staff, a Program Prioritization Steering Committee consisting of Kimley-Horn and a select number of members from the TTAC, including representatives from VDOT, HRT, WATA, branches of the United States Military, VPA, and each of the Hampton Roads localities, was assembled. The Steering Committee convened multiple times between July and December of 2009 to develop the initial Program Prioritization Process. Additionally, during each

month between September and December of 2009, presentations were made to both the TTAC and HRTPO Board to provide updates on the project status and to obtain their endorsement on the progress to date. After the third component of economic vitality was recommended, the Steering Committee convened once again in April 2010, and presentations were made to both the TTAC and HRTPO Board in both May and July 2010. **Figure 2** illustrates the project meeting timeline.

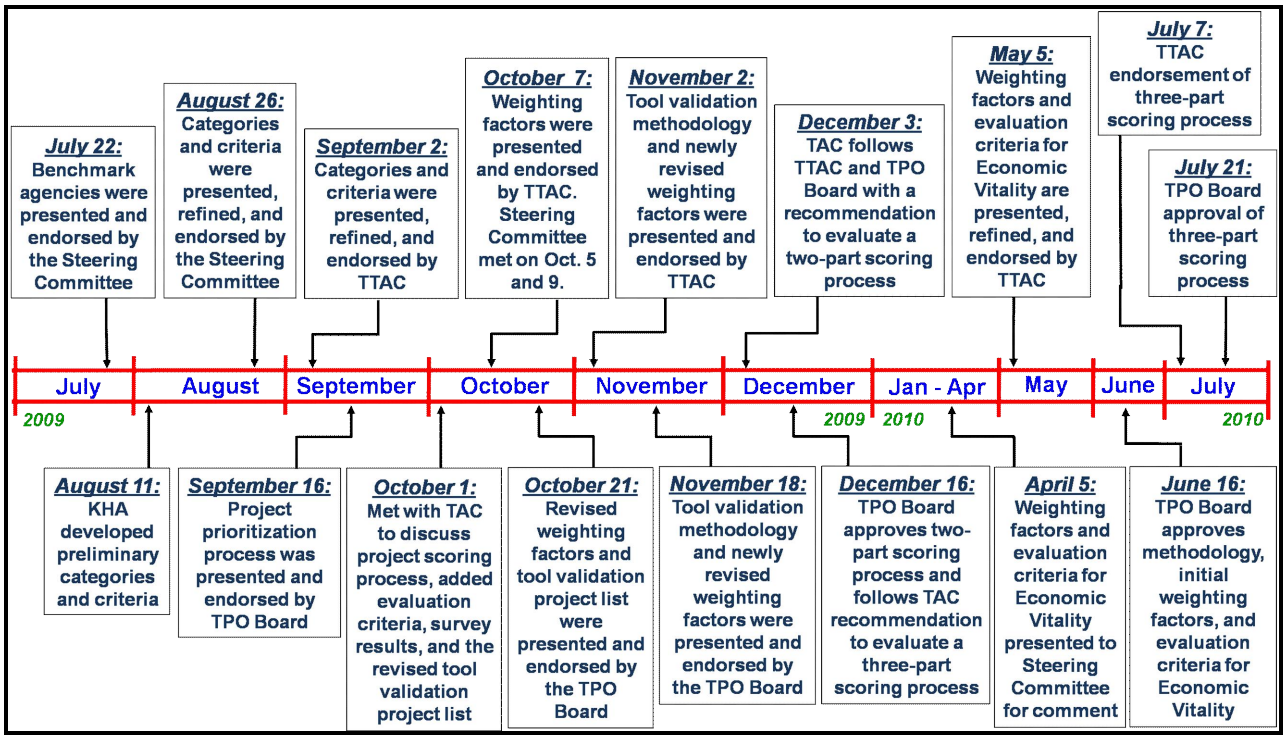
July 22: Benchmark agencies were presented and endorsed by the Steering Committee
August 26: Categories and criteria were presented, refined, and endorsed by the Steering Committee
September 2: Categories and criteria were presented, refined, and endorsed by TTAC
October 7: Weighting factors were presented and endorsed by TTAC. Steering Committee met on Oct. 5 and 9.
November 2: Tool validation methodology and newly revised weighting factors were presented and endorsed by TTAC
December 3: TAC follows TTAC and TPO Board with a recommendation to evaluate a two-part scoring process
May 5: Weighting factors and evaluation criteria for Economic Vitality are presented, refined, and endorsed by TTAC
July 7: TTAC endorsement of three-part scoring process
July 21: TPO Board approval of three-part scoring process
July
August
September
October
November
December
Jan - Apr
May
June
July
2009
2009
2010
2010
August 11: KHA developed preliminary categories and criteria
September 16: Project prioritization process was presented and endorsed by TPO Board
October 1: Met with TAC to discuss project scoring process, added evaluation criteria, survey results, and the revised tool validation project list
October 21: Revised weighting factors and tool validation project list were presented and endorsed by the TPO Board
November 18: Tool validation methodology and newly revised weighting factors were presented and endorsed by the TPO Board
December 16: TPO Board approves two-part scoring process and follows TAC recommendation to evaluate a three-part scoring process
April 5: Weighting factors and evaluation criteria for Economic Vitality presented to Steering Committee for comment
June 16: TPO Board approves methodology, initial weighting factors, and evaluation criteria for Economic Vitality

Figure 2 - Project Meeting Timeline

It was essential to the project that buy-in was achieved at each step of the process to assure that the project was progressing in the proper manner and all assumptions and applications were transparent. These same stakeholders also will participate in the development of the 2034 LRTP and will continue to provide input on the criteria and MOEs as actual projects are evaluated in the development of the regional plan.

1.3 SAFETEA-LU: Federal Planning Factors

As with all federally related projects, it is critical that all assumptions be consistent with the eight SAFETEA-LU Federal Planning Factors. SAFETEA-LU (Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users) is the Federal authorization of funding for surface transportation programs for highways, highway safety, and transit for the five-year period from 2005 to 2009. Along with identifying federal funding for a range of transportation programs and other transportation related regulations, SAFETEA-LU updated requirements for metropolitan transportation planning, where all newly adopted regional transportation plans (RTP) must comply with federal regulations. Throughout the

development process of the Hampton Roads Program Prioritization methodology, all assumptions were based upon the eight SAFETEA-LU Federal Planning Factors, which are as follows:

1. *Support the economic vitality of the metropolitan area, especially by enabling global competitiveness, productivity, and efficiency.*
2. *Increase the safety of the transportation system for all motorized and non-motorized users.*
3. *Increase the ability of the transportation system to support homeland security and to safeguard the personal safety of all motorized and non-motorized users*
4. *Increase accessibility and mobility of people and freight*
5. *Protect and enhance the environment, promote energy conservation, improve the quality of life, and promote consistency between transportation improvements and state and local planned growth and economic development patterns*
6. *Enhance the integration and connectivity of the transportation system, across and between modes, for people and freight*
7. *Promote efficient system management and operation*
8. *Emphasize the preservation of the existing transportation system*

Understanding the importance of consistency between local prioritization, federal requirements, and ultimate federal funding, the proposed categories and criteria (as identified in Chapter 4) were referenced to these specific planning factors to illustrate their compatibility. **Appendix A** provides further detail on how the eight Federal Planning Factors were considered in the prioritization process. It should be noted that the federal transportation bill is currently being reviewed for reauthorization, so planning factors may need to be adjusted to reflect the final bill.

2. Literature Review

2.1 VDOT and HRTPO Literature Review

Prior to developing the Program Prioritization Process, existing programs currently being used by the HRTPO and VDOT were researched. A literature review of the existing programs helped provide an understanding of the other processes currently in place as well as a basis to examine any lessons learned. The literature review included the HRTPO Congestion Mitigation and Air Quality (CMAQ) and Regional Surface Transportation Program (RSTP) processes, the HRTPO 2030 LRTP, and VDOT's VTrans 2025 State Highway Plan. A summary of each of these existing processes is detailed below.

2.1.1 Congestion Mitigation and Air Quality

The Congestion Mitigation and Air Quality Act was established in 1990 by Congress in order to meet National Ambient Air Quality Standards (NAAQS). The CMAQ program provides more than $8.6 billion in funds to state DOTs, MPOs, and transit agencies to invest in projects which reduce air pollutants.

From 1993 to 2003, the Hampton Roads region received more than $90 million of CMAQ funding *(HRMPO CMAQ/RSTP Report, 2003)*. These funds were allocated to bikeway/pedestrian, new transit service, bus replacement, transportation demand management (TDM), signal system integration, intersection geometric improvement, and Intelligent Transportation System (ITS) projects. CMAQ project funding allocations are dependent on the amount of air quality improvement expected per dollar spent. Improvements in air quality are measured by the reduction in the emissions of volatile organic compounds (VOC) and nitrogen oxides (NOx).

As a region, the total project cost has always exceeded the funding available. Therefore, in 1992, the HRTPO established a process for determining the appropriate level of funding for proposed projects. This process was initially developed following the passage of the Intermodal Surface Transportation Efficiency Act (ISTEA) and was revised in 1995 and 2001. In order to receive full funding for larger projects, a phased approach is used to provide funding over a period of several years. Projects receive a ranking for both VOC and NOx emission improvements individually within each category. These rankings provide an overall score by which the projects receive a composite ranking. Projects are then prioritized in increasing order of composite rankings for funding allocation. This is illustrated in a hypothetical example in **Table 1** below.

Project	VOC Rank	NOx Rank	Composite Ranking (VOC + NOx)	Overall Ranking
A	1	6	7	4
B	6	5	11	6
C	2	2	4	1
D	5	4	9	5
E	4	1	5	2
F	3	3	6	3

Table 1 - CMAQ Ranking Procedure Example

2.1.2 Regional Surface Transportation Program

Established in 2005, the SAFETEA-LU provides Regional Surface Transportation Program (RSTP) funding through the end of 2009. All projects consistent with the eight Federal Planning Factors are eligible for funding. To ensure that projects in each region are allocated funds, each MPO receives specific CMAQ and RSTP allocations. This allows projects to compete on a regional, rather than statewide, level.

From 1993 to 2003, the Hampton Roads region received more than $200 million of RSTP funding *(HRMPO CMAQ/RSTP Report, 2003)*. Approximately 69 percent of these funds were allocated to highway projects, while approximately 31 percent were allocated to non-highway projects such as transit, bikeway/pedestrian, and ITS projects. Similar to the CMAQ funding process, the HRTPO established a process in December 1999 to more objectively allocate available funding. When assigning funding allocations to individual projects, all potential projects are first categorized by project similarity. These categories include:

- **Highway Capacity, Accessibility, and Operational Improvements**
  - *Roadway Widening, New Facilities, High Occupancy Vehicle (HOV) Lanes, New Interchanges, Intersection/Interchange Improvements, Corridor Operational Improvements, and Bridge Rehabilitation*
- **Intermodal Transportation Projects**
  - *Passenger and Freight Facilities*
- **Transit Projects**
  - *New Service, Expansion of Existing Service, Bus Shelters/Facilities, Vehicle Replacement/Purchase, Fixed Guideway, and Other Transit and ITS Projects*
- **Planning Studies**
  - *Alternatives Analysis and Other Planning Studies*
- **TDM Projects**
  - *Regional Rideshare, Marketing and Outreach Program, HOV Express Bus Service, and Park-and-Ride Lots*
- **ITS**
  - *Intelligent Transportation Systems*

Once projects are categorized, each project is assigned points based on specific criteria that are weighted differently within each category. A maximum of 100 points can be obtained by a project, regardless of category. These criteria can be found in **Appendix B**. As with the CMAQ process, the RSTP process was established through the TTAC committee, and criteria and weighting factors were agreed to by the committee. An application process was established to obtain specific information from municipalities such that the HRTPO staff can evaluate and rank each project using the agreed-upon criteria. Once scored, projects are ranked from highest to lowest. Funding is then distributed based on project score/ranking, available funding, and any other factors such as prior commitment and federal mandates. The number of projects which receive funding varies based on decisions made by the CMAQ/RSTP Subcommittee. Funds

are allocated by ranking, and the Subcommittee tries to ensure that selected projects are fully funded. The highest ranked project is fully funded, and subsequent projects are funded fully until all funds have been distributed. This funding distribution is given to projects in order, based on rank. Once all funds have been distributed the remaining projects receive no funding from the TTAC.

2.1.3 VDOT 2025 State Highway Plan

The 2025 State Highway Plan (SHP) is the most recently adopted statewide plan identifying solutions to interstate and highway deficiencies throughout the Commonwealth. The 2025 SHP is a key element to Virginia's Statewide Long-Range Multimodal Transportation Plan (VTrans2025), assisting decision makers in identifying the key needs of the interstate and primary highway systems. The 2025 SHP is only one component of the statewide planning process which also includes the Highway Needs Assessment (HNA) and a Project Prioritization methodology. Combined, these three steps establish a technical method for identifying specific recommendations and ranking them in order of importance and necessity for funding.

The statewide planning process is designed to identify the most feasible, practical, and viable recommendations for the Virginia interstate and highway networks. The first component of the planning process, the HNA, identifies performance deficiencies without financial constraint. Each of the performance deficient areas is identified through the use of Statewide Planning System (SPS) data which also captures population, employment, and land use growth projections. The HNA neither identifies the need for new facilities or alignments nor accounts for system continuity but rather assesses current infrastructure deficiencies.

Upon completion of the HNA, the second stage of the statewide planning level process, the plan development stage, is begun. This stage is what decision makers refer to as the SHP. The SHP is a "vision plan" and, similar to the HNA, does not require the plan to be financially constrained. Therefore, the SHP is a comprehensive list of corridor studies, urban area studies, MPO constrained LRTPs, and field reviews needed, assuming funding is not an issue. One main difference between the SHP and the HNA is that in the SHP, a planning level cost is provided to perform the proposed project. The SHP focuses on five main goals:

1) Provide a transportation system that facilitates the efficient movement of people and goods, including reducing congestion; maximizing benefits for the greatest number of users; and enhancing access and connections to ports, airports, transit stations, or other intermodal facilities.

2) Provide a safe and secure transportation system. This includes facilitating the military and citizens during emergency situations.

3) Retain and increase business/employment opportunities by enhancing the movement of goods and providing transportation investments in economically disadvantaged areas.

4) Improve the quality of life and minimize environmental impacts, including cultural, environmental, and community impacts.

5) Preserve the existing transportation system and promote efficient system management. This involves encouraging access management, reducing reliance on single occupancy vehicles (SOV), minimizing long-term maintenance costs, and maximizing the use of limited highway funding.

The final stage of the planning process is highway prioritization (HP). This step involves taking the list of recommendations presented in the SHP and using an established set of categories, criteria, and weighting factors to prioritize the recommendations for future funding. The main objective of this prioritization is to ensure that funds are allocated to the most practical and necessary projects first. Criteria used in the HP evaluation include crash rates, level of service (LOS), volume to capacity (V/C) ratios, project viability, public feedback, and the amount of funding available. However, before any prioritization is performed, all recommendations are categorized within a three-tier system. In this system, each tier is defined by the time span in which a recommendation is expected to be needed/occur. The first tier is defined as those projects or phases of a project occurring in the next six years. The second tier includes projects thought to occur in the next seven to 15 years. The final tier includes all long-range projects set to occur more than 15 years out.

Beginning with the first tier, projects are analyzed qualitatively and quantitatively to obtain results which will be compared to the established criteria previously described. Once ranked from high to low priority, funds are allocated. Not all projects are fully funded. Projects which are not fully funded may or may not be completed. These projects are monitored, and options for short-term resolutions are explored in the following three categories:

1) Access Management: Consolidating or eliminating access points can delay the need for adding new lanes or building new facilities.
2) Travel Demand Management: Encouraging people to carpool, use transit, or modify their work schedule to avoid peak commute times can greatly reduce the demand currently placed on facilities.
3) ITS: Technology provides the traveling public with information regarding their trip and travel options in advance of their departure.

Additional funds may be allocated to make improvements in one of the aforementioned categories. Often, these minor changes relieve the burden on the existing roadway and allow the project to be pushed to a later date.

The following diagram (**Figure 3**) is referenced from VDOT's VTRANS2025 SHP Technical Report. The diagram serves as an illustration to the VDOT planning process from the development of the HNA to the final Project Prioritization.

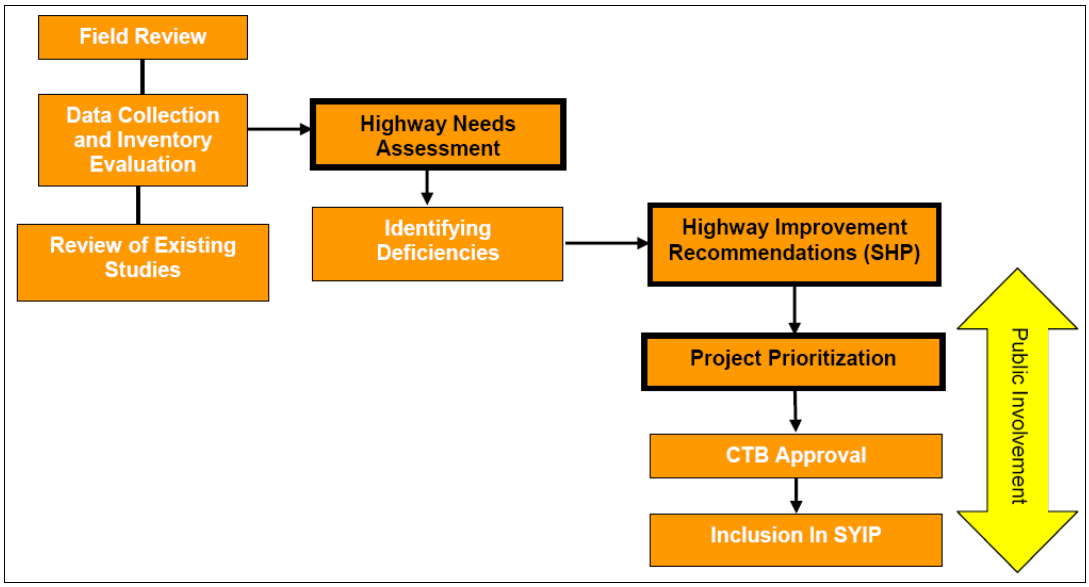

Figure 3 - VDOT State Highway Plan Development[2]

(Bolded boxes indicate Statewide Planning Process phases)

After Project Prioritization is completed a project must be approved by the Commonwealth Transportation Board (CTB) before being included in the Six-Year Improvement Plan (SYIP). The SYIP includes all highway and transit construction projects and project staging statewide for interstate, primary, secondary, and urban systems. Following the final Project Prioritization within each VDOT district, each district review team recommends from one to three interstate system priorities and five primary system priorities from the first tier. These projects are presented to the CTB for approval.

Not all projects presented to the CTB are passed and become a part of the SYIP. Various factors are taken into consideration before CTB approval, including available funding, project viability, and public feedback. These factors and others impact the passage of a project into the SYIP.

2.1.4 2030 Long-Range Transportation Plan

To date, there is no formalized process used by the HRTPO in prioritizing future candidate LRTP projects. Therefore, HRTPO staff used a variety of evaluation criteria to evaluate projects included in the most recent fiscally constrained plan. In addition to funding constraints, the LRTP also must be evaluated under a rigorous air quality conformity plan. Overall, candidate projects were evaluated by the HRTPO using ten criteria which are described in more detail below:

1) **Volume of Vehicles Served**: The difference between the expected amount of traffic *with* the project and the amount of traffic expected *without* the project.

[2] Obtained from the 2025 VDOT State Highway Plan Technical Report (December 2005)

2) **Existing and Future LOS**: Existing LOS from the 2005 Congestion Management System Report (based on traffic counts from 2001-2003) versus the future LOS from the 2030 LRTP.

3) **Speed:** The difference in speed in the project area, both with and without the project.

4) **Congested Travel Time per Highway Trip**: The impact of each candidate project on the average travel time of all regional trips (obtained from the LRTP), measured in minutes. Additionally, the expected impact of each candidate project on the average travel time of trips to each transportation analysis zone (TAZ) also was calculated.

5) **Nearby Roadways**: The LOS on the nearby alternate route, with and without the project, was observed.

6) **Impact on Minority and Low-Income Residents**: The percentage of households in poverty as well as the percentage of households headed by persons of minority groups near each project.

7) **Cost Effectiveness**: A ratio of total project cost per vehicle-mile traveled.

8) **Safety**: Existing crash rate from the "Hampton Roads Regional Safety Study" was prepared for each project.

9) **System Continuity**: The degree to which the proposed project completed a missing link or improved a congested link in the transportation network.

10) **Air Quality:** This criterion was dependent on the change in speed, where it was used to forecast whether the project would reduce NOx and hydrocarbon (HC) emissions.

2.2 Economic Vitality Literature Review

As previously mentioned, the SAFETEA-LU transportation authorization bill, which was signed into law on August 10, 2005, describes eight Federal Planning Factors which must be considered in long-range planning. One of these factors stipulates that an LRTP support the economic vitality of the metropolitan area, especially by enabling global competitiveness, productivity, and efficiency. Additionally, the economic downturn, which started in December 2007, encouraged states and MPOs to maximize the benefit of their transportation dollars, and thus planners increasingly focused on ensuring that infrastructure projects both offer utility and enhance long term growth, easing the burden of the poor economy. This literature review represents the efforts of the HRTPO to understand the economics of transportation and the economic development impacts that might result from transportation improvements within the Hampton Roads region. The literature review process developed the foundation for the MOEs used for the economic vitality component of the prioritization process. A full bibliography of this literature review is provided in **Appendix C**.

HRTPO staff examined two types of transportation economics software to aid in the economic vitality process: *TREDIS* and *REMI Transight*. While both models attempt to measure the economic impacts of

transportation projects, they have slightly different outputs. *REMI Transight* focuses on measuring economic growth impacts from regional ground transportation projects. *TREDIS* evaluates various modes of travel and focuses on the costs and benefits of transportation improvements. The methodology employed by the two models supported staff findings from the literature review, and the schematics of both models assisted in developing the methodology for the weighting structure of the economic vitality components.

Staff also reviewed the prioritization processes of multiple MPOs and State DOTs to determine the norms for economic prioritization. While many organizations have not attempted to formally incorporate economic vitality into their prioritization process, both Ohio and Utah developed unique systems that incorporate a detailed economic development component. Ohio DOT has developed a Transportation Review Advisory Committee (TRAC) composed of experts and appointees, and this group considers how major projects increase the accessibility of a region for economic development, including how it impacts job creation and job retention. The Utah criteria also had influence over how the MOEs were designed for the economic vitality component, as well as in developing a framework for designating economic choke points. While similar strands of economic analysis are present in their various prioritization processes, the distinctive methodologies demonstrated by different MPOs and State DOTs reveal that measures of economic vitality need to be specifically tailored to the unique economies of the regions they are working to evaluate.

There are numerous ways to interpret economic vitality. Several key concepts as identified by the Oregon Department of Transportation are as follows:[3]

- Diversified, Competitive Regional Economy
- Long Term Economic Growth
- New and Expanding Business Opportunities
- Healthy, Efficient Markets
- Plentiful Jobs, Suitable workers

The concepts address many of the key points related to economic vitality, but for Hampton Roads these items clearly need to be addressed as well:

- Access to transportation for all who reside in, or travel to, the region
- Enhance regional productivity and competitiveness
- Remove economic choke points

[3] Reiff, B. and Gregor, B. Transportation Planning Performance Measures- Final Report. Oregon Department of Transportation. October 2005 <Accessed June 15th>
http://www.oregon.gov/ODOT/TD/TP_RES/docs/Reports/PlanningPerformanceMeasures.pdf?ga=t

Figure 4 illustrates the mechanism through which transportation system improvements create growth. Transportation improvements create new capability, increased reliability, and decreased total travel time for an area; effectively lowering the cost of transportation and increasing business productivity. Additionally, these elements shorten commutes, effectively expanding businesses' labor pool creating economies of scale and scope which also increase a business' competitiveness. As regional businesses become more competitive, the twin effect of growing businesses and new business starting in the region creates a long term increase in economic growth.

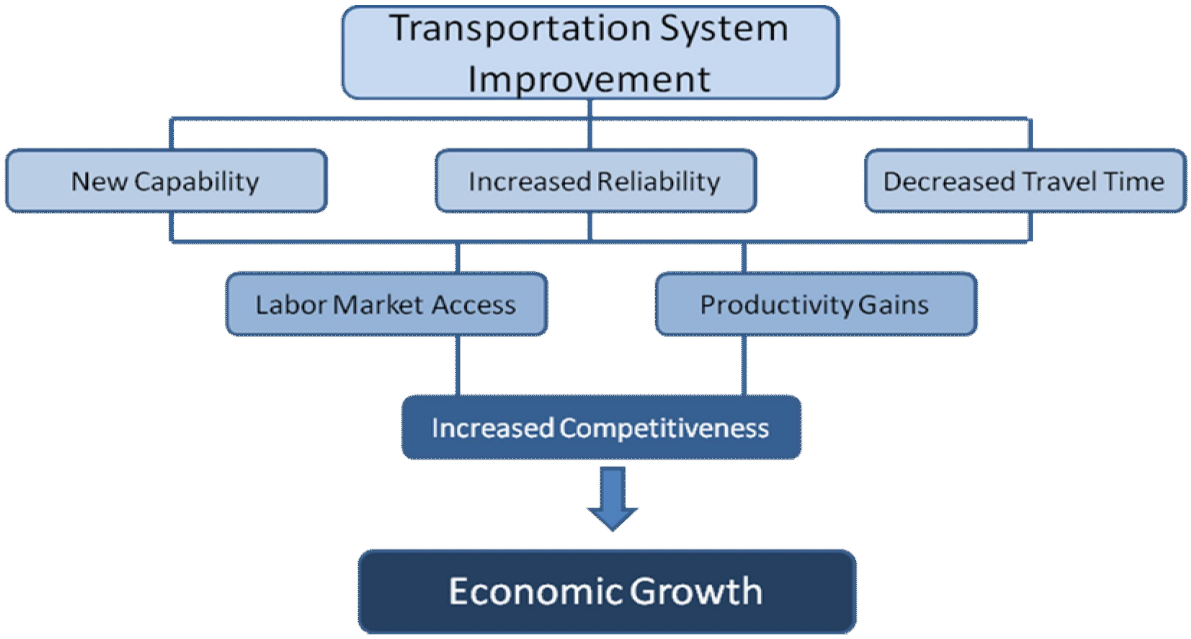

Figure 4: Mechanism through which Transportation System Improvements Create Growth

The link between transportation and economic development was noted by Adam Smith in his seminal work of 1776, *The Wealth of Nations*, and clearly this has been a powerful idea since the control of the spice routes and the silk road have been the major drivers of international politics for a millennium. The development of towns and cities has revolved around providing access to producers and customers through transportation routes and market creation. As a region's transportation infrastructure improves, its economy can influence an increasing amount of workers, producers, and markets, and grow as it incorporates these into its regional market.[4]

It is important when analyzing the impacts of transportation on the regional and national economy to understand that the U.S. has been investing in transportation for over two centuries, beginning with canals around the 1800s and railroads from the 1840s through 1900. The Eisenhower interstate system first authorized by the Federal-Aid Highway Act of 1956 began the process of creating over 45,000 miles of

[4] Weisbrod, G. (2006)

U.S. interstate, binding the nation together and providing large economic benefits as regional markets were linked by efficient freight for the first time. These years of investment have created an extremely strong transportation infrastructure across the nation. Due to the law of diminishing returns, it is unlikely that any new road building project (or even series of projects) will see the economic development boost that the U.S. previously experienced.[5] This does not preclude localized benefits from a project, but it does explain the focus that State DOTs and MPOs have placed on maintaining the nation's already strong infrastructure.

Economics literature stresses that transportation plays a vital role in economic development but cannot by itself create economic development. There is an appropriate mathematical term that summarizes this concept: transportation is a necessary but not sufficient condition for economic development. It is important to recognize that transportation supports economic growth when the other conditions are already in place, but transportation will fail to induce growth (the bridge to nowhere would be an example of this).[6] Furthermore, it is difficult to establish the direct effect between transportation and economic development, so no single specification for the econometric models has been settled upon, and thus even measuring the effect of completed infrastructure projects relies on many subjective decisions and analysis by the economist.[7] In many ways, economic analysis of this topic is shaped by the unique geographies and idiosyncratic features of each regional economy, and thus there is no "one size fits all" tool that is suitable for such an analysis.

Traditional economic analysis of transportation infrastructure focused on cost-benefit analysis of items which were easy to measure, including safety improvements, lower vehicle operating costs, and particularly the economic benefits of travel time savings. Travel time was particularly important in early analysis, as 80% of the monetized benefits in the cost-benefit analysis are attributable to travel time savings.[8] Accurately estimating the economic value of time was crucial for this kind of analysis, but for the purposes of the HRTPO selection process this proves unnecessary. Since the tool ranks projects within the region, social value of time can be held constant. Travel time savings alone can be used as a part of the ranking, and travel time will accurately reflect the relative benefits to the region.

Using surveys to measure the impact of infrastructure projects on businesses is another method of evaluating the economic impact of a transportation project, and this is often used because the impact on employment was often reported in the survey. Surveys also seem to solve a variety of data issues, as much of the data, especially as they relate to freight or commute times, were difficult to parse out historically. It allowed planners to access relevant details, as explained here:

[5] Ewing 2008- "comparatively small improvements to interregional accessibility."

[6] Schultz and McGee 2009

[7] Gkritza et al. 2007

[8] Mackie et al 2001

> "The evaluation of transportation projects has traditionally been made by assessing changes in travel time, vehicle operating cost, and safety. The broad long-term effects on economic development (job, income, and business growth) are a concern to transportation planners and decision makers, but have been often overlooked due to the lack of reliable…data."[9]

Surveys would allow one to estimate job, income, and business growth, but unfortunately there are two significant flaws with surveys. First, surveys are extremely blunt tools that expect business owners not only to know future economic conditions but also to understand the complex interactions a major project would have with their business. Second, conducting a statistically significant quality survey tends to be prohibitively expensive. Given their expense and the fact that they mask data issues rather than solve data issues, surveys are not the correct tool for measuring economic vitality.

Another technique examines land value changes that occur around infrastructure projects. Quite easily executed, this method uses a multi-linear regression analysis to isolate the effect that a transportation project had on growth in real property values. This method measures accurately the change in land value created by existing projects, but when forecasting the impacts of future projects it becomes less robust because other variables that influence land values must also be forecasted, including population, regional economic growth, and demographic characteristics of the population; the errors from all of these forecasted variables become excessive when included in one model. Furthermore, economists question the validity of including this method in a cost benefit analysis. Certainly, at least a portion of the change in economic development around a project was relocated within the region, and once a certain level of infrastructure has been achieved, these projects tend to merely move development within the region.[10]

The interaction between land use, development, and transportation infrastructure retains an important role in the economic prioritization decision because infrastructure determines how the region will grow. Infrastructure projects determine the geographic extent of the region, as well as influence the regional land use pattern. Determining that proposed projects fall within long-range development plans has shown to be key in selecting projects that do not impede long-term development. It also is important to develop roads that improve access to currently vital economic areas, thereby removing economic choke points and providing access to new opportunities for growth.[11]

Labor force access remains the primary influence over the business location decision, and any assessment of a transportation project's enhancement of economic vitality needs to estimate the labor market impact

[9] Gkritza 2006

[10] Cervero 2009- "Moreover, evidence shows that land-use impacts are more redistributive than generative, shifting growth that would have occurred somewhere to one part of the region."

[11] CSI et al 2008, Schrank and Lomax 2007, Kymel 2009

of that project. Most businesses consider it essential to locate in proximity to large population centers in order to access fully developed labor markets.[12] Projected areas of high employment are well developed labor markets by definition, and projects that increase accessibility to these areas will have a significant impact on regional growth. Reducing travel time uncertainty serves as a further method of increasing the effective size of the labor force.[13] While reducing travel time has a major impact on commutes, understanding the approximate time in transit prevents scheduling issues through either lateness or early arrivals, significantly impacting a worker's willingness to commute. Additionally, centers of higher education have a large impact on a business' ability both to access highly skilled labor and to train the workers that they already employ.[14]

Lastly, basic sector industries, which serve demand external to the region (i.e., they export goods and services from the region), bring new money into the regional economy and allow for greater economic development through indirect and induced growth.[15] These are key drivers of regional growth, and part of ensuring economic vitality comes from maintaining or growing these assets. Hampton Roads has three basic sector industries of significant size already developed in the tourism industry, ports, and Department of Defense. Projects that increase access to these industries and increase their productivity are most likely to have long-term impacts on the region's growth rates. Enhancements to productivity drive changes in econometric modeling software such as *TREDIS* and *REMI Transight*, but because the HRTPO compares only projects within the region, a simple measure of increased access to these industries in Hampton Roads will present an accurate picture of a project's ability to enhance productivity.

[12] CSI et al 2008

[13] Hymel 2009

[14] Gkritza et al 2007

[15] Stimson et al 2006.

3. Nationwide Benchmark Agency Research

In an effort to develop a reputable prioritization methodology in an efficient and timely manner, Kimley-Horn and the Steering Committee sought to benchmark other agencies around the country. A range of agencies were considered for peer review that included a cross section of agency types, locations, and organizations so that this process could benefit from lessons learned and an understanding of the strengths and weaknesses of established methodologies. Information gathered from these reviews was considered in the development of categories, evaluation criteria, and weighting factors for the HRTPO.

3.1 Agency Selection

Kimley-Horn queried its internal database of 62 offices in 15 states to seek input on potential benchmarking agencies. This query generated a list of 20 potential benchmark agencies. Kimley-Horn gathered information regarding the area population for each agency, the number of members within each agency, approximate age of its prioritization process, and approximate number of projects evaluated. Based on this information, Kimley-Horn narrowed the list to ten agencies, which was reviewed by the Steering Committee to identify which agencies would be interviewed in detail. Given the time and budget constraints associated with the scope of this project, six agencies for benchmarking were selected for phone interviews—three conducted by Kimley-Horn and three conducted by members of the Steering Committee. The Steering Committee selected the following agencies to be contacted by Kimley-Horn based on their attributes:

- **Fredericksburg Area Metropolitan Planning Organization (FAMPO)**
  - *In-state MPO*
  - *Comprehensive process*
  - *Recently updated process*
- **North Carolina Department of Transportation (NCDOT)**
  - *Neighboring state*
  - *Statewide process (not just one MPO)*
  - *Process has been in place for more than 20 years and is currently being updated*
- **Atlanta Regional Commission (ARC)**
  - *Large urban area with many member agencies*
  - *Significant number of projects in TIP*
  - *Strong reputation with established and published process*

Since the above three agencies were all located along the east coast, the Steering Committee requested that the additional three agencies be considered to obtain a more “nationwide” assessment. Several Steering Committee members agreed to provide additional support to maintain the original project budget and timeline. These additional agencies were chosen based on strong attributes that would

provide the Steering Committee with a broader range of variables. The three other agencies that were contacted by members of the Steering Committee included:

- **Maricopa Association of Governments (MAG) – Phoenix**
  - *Serves as the Regional Agency for the metropolitan Phoenix area*
  - *Program Prioritization process has been in effect since 2004*
- **Denver Regional Council of Governments (DRCOG)**
  - *Serves as the Regional Agency for the metropolitan Denver area*
  - *Program Prioritization process has been in effect since the early 1980s*
- **Sacramento Area Council of Governments (SACOG)**
  - *Association of local governments in the six-county Sacramento Region (22 Cities)*
  - *Program Prioritization process has been in effect since 1999*
  - *Received the 2008 Honorable Mention Award for Excellence in Metropolitan Transportation Planning from the Association of Metropolitan Planning Organizations (AMPO) for their prioritization work for their 2035 Metropolitan Transportation Plan*

In an effort to collect consistent and relevant information on each benchmark agency's prioritization methodologies, Kimley-Horn presented a draft list of questions to the Steering Committee for review. Once the list of questions was finalized, a formal questionnaire was developed. The questionnaires were then administered to each of the six benchmark agencies through individual phone interviews. The questionnaires and phone interviews helped to not only determine actual inputs into the existing programs, but also to determine the strengths and weaknesses of each agency's approach and the timelines needed to develop a consensus-based methodology.

3.2 Fredericksburg Area Metropolitan Planning Organization

FAMPO is part of the George Washington Regional Commission (GWRC) and was established in 1993. FAMPO serves a population of more than 310,000 and includes the City of Fredericksburg and Counties of Caroline, King George, Spotsylvania, and Stafford. FAMPO is responsible for creating, developing, and reviewing multiple transportation plans. Major efforts of this organization include the development of the 25-year Long-Range Transportation Plan (LRTP), three-year Transportation Improvement Program (TIP), the annual Unified Planning Work Program (UPWP), the Bicycle and Pedestrian Plan (BPP), the Public Participation Plan (PPP), travel models, thoroughfare plans, and transit plans. Each of these transportation plans is designed to identify transportation programs, funding opportunities, and projects.

Under the LRTP, there are typically more than 200 projects identified on the unconstrained needs list totaling approximately $8 billion in needs. This list is greatly reduced to a list of 45 to 50 projects once the constrained LRTP budget of $1.5 billion is applied. Each year, approximately 15 to 20 projects are programmed for funding. LRTP projects are categorized based on roadway functional classification.

LRTP projects are prioritized by the MPO based on a ranking methodology established in 2008. Under the recently developed LRTP ranking methodology, a technical committee facilitates the prioritization process. Initial highway project requests are sent to the MPO by local members, typically as part of a local comprehensive plan. These highway projects are then divided by roadway functional classification and proposed year of implementation. MPO staff and the technical committee then rank the projects for each class and submit the ranked list to the policy board, which is comprised of elected officials, for approval and adoption.

Long-Range Transportation Plan

The methodology for ranking highway projects in the LRTP uses a point based system in which each project can receive a total of up to 100 possible points. The project ranking process for the LRTP took about one month. However, it took about five months to build consensus on the prioritized list due to an iterative process with ongoing communication between MPO staff, staff from local agencies, and political decision makers. The prioritization process is anticipated to be reviewed every four years as part of the LRTP updates. The evaluation criteria used to prioritize projects for the LRTP are consistent with FAMPO's mission to provide a cooperative, continuous, and comprehensive ("3C") transportation planning process. The 100 points are allocated among these criteria as follows:

- Congestion Relief – 30 Points
- Safety and Security – 30 Points
- Environmental Impacts – 16 Points
- Public and Community Support – 8 Points
- Funding and Implementation Considerations – 8 Points
- Smart Growth/Mobility – 8 Points

Total Possible Score – 100 Points

Furthermore, these criteria meet the eight federal SAFETEA-LU planning factors and consider prioritization methodologies used in other areas. Further details of the LRTP program prioritization process are provided in **Appendix D**.

3.3 North Carolina Department of Transportation

Transportation plans developed by NCDOT include the 25-year Long-Range Statewide Multimodal Transportation Plan, ten-year Program and Resource Plan, and five-year Work Program. Each of these transportation plans is designed to identify transportation programs, funding opportunities, and individual projects.

The current seven-year Transportation Improvement Program (TIP) for NCDOT identified approximately 3,000 projects, though not all were funded. The estimated five-year total budget for NCDOT is $20 billion (or approximately $4 billion per year). At the statewide level, TIP projects account for approximately $1.2 billion per year, not including planning and engineering costs.

Currently, the NCDOT relies on Project Prioritization performed by the state's MPOs and rural planning organizations (RPO). Within the state of North Carolina, there are 17 MPOs serving urban areas having a population of 50,000 or more and 20 RPOs representing the remaining planning areas across the state. At least half of the MPOs and RPOs rank their own projects using some form of data-driven prioritization methodology, while the others use a qualitative analysis. NCDOT is developing a program prioritization process that is expected to be in place by 2010 and will be administered by the Strategic Planning Office of Transportation (SPOT). The new program prioritization methodology will focus on prioritizing projects for years six through ten contained in the ten-year Program and Resource Plan. Projects identified for years one through five are already included in the five-year Work Program (which includes the TIP) and therefore will not be reprioritized.

Under the new process, the SPOT will rank highway projects submitted by the MPOs and RPOs and present the unconstrained list to management. Management will then determine the amount of money available for each of the nine project categories. With the help of the financial division, funding constraints and regional equity will be applied to develop the constrained list. This draft statewide TIP will then go through a public hearing process for final approval by the Board of Transportation. The public hearing process typically takes seven to nine months.

The prioritization process under development will include a combination of quantitative and qualitative data including a weighted ranking system based on tier, goal, and MPO/RPO rankings. Highway projects will first be classified into one of nine categories representing three tiers (Statewide, Regional, and Subregional) and three goals (Mobility, Safety, and Infrastructure Health). The simple matrix below illustrates the nine potential categories:

Statewide Mobility Projects	Regional Mobility Projects	Subregional Mobility Projects
Statewide Safety Projects	Regional Safety Projects	Subregional Safety Projects
Statewide Infrastructure Health Projects	Regional Infrastructure Health Projects	Subregional Infrastructure Health Projects

A quantitative score will be developed for each project on a 100-point scale relative to congestion, safety, and pavement condition, which reflect the three established goals. Additionally, a qualitative score also will be established based on the rankings provided by local MPOs and RPOs as well as the qualitative divisional ranking. The qualitative and quantitative scores will then be combined to obtain the overall project score to rank each project within the nine categories. Project prioritization for non-highway

projects is performed by the appropriate modal division for the state. Not all modes have a data-driven methodology at this time.

The prioritization process, which is based on the mission and goals of NCDOT, is anticipated to be reviewed every two years as part of the ten-year plan updates. Further details of the proposed NCDOT prioritization process are provided in **Appendix D**.

3.4 Atlanta Regional Commission

ARC is the regional planning and intergovernmental coordination agency serving the 10-county area of Georgia including Cherokee, Clayton, Cobb, DeKalb, Douglas, Fayette, Fulton, Gwinnett, Henry, and Rockdale counties, as well as the City of Atlanta. ARC is responsible for creating, developing, and reviewing multiple transportation plans including the 20-year Regional Transportation Plan (RTP), six-year Transportation Improvement Program (TIP), annual Unified Planning Work Program (UPWP), regional Bicycle and Pedestrian Plan, and Transportation Public Participation Plan as well as various travel models, thoroughfare plans, and transit plans. Each transportation plan is designed to identify transportation programs, funding opportunities, and individual projects.

There are approximately 1,500 projects included in the 20-year RTP, 900 of which are included in the TIP. The TIP represents the first six years of the RTP. The overall annual budget is approximately $700 million to $800 million, which is driven by local bond funding for local projects.

Although projects are typically solicited from the localities, given the severe financial constraints facing the region, projects for the current plan were identified through a Needs Assessment Report conducted by ARC. This regional assessment looks at trends and sets the goals, policies, objectives, and vision for the long-range plan. Each project was then categorized under one of three investment priority areas approved by the ARC Board including:

1. System Management, Optimization, and Operations – Smart Corridors
2. Demand Management – Transportation Demand Management, Bicycle/Pedestrian, Livable Centers Initiative, and Others
3. System Expansion – Transit and Road

Once projects are categorized under the three priority investment areas, they are then prioritized using an approved methodology. Managing current assets, which includes the projects in Category 1, is given the highest priority. Managing demand, which includes the projects in Category 2, is given the next highest priority. System expansion projects are given the next priority and are evaluated by ARC staff using a quantitative scoring methodology. ARC has been using this type of methodology to rank projects for ten years. Due to the need for travel demand modeling, the project ranking process typically takes three to four months. During the previous plan update, it took an additional six months for the Policy Board to build consensus and approve the prioritized program.

The evaluation criteria and weighting factors are developed based on the goals and vision of the RTP and are reevaluated with each RTP update (every three to four years). Unlike system and demand management projects which do not compete for funds, system expansion projects are evaluated on a 100 percent basis against four major components, with congestion relief accounting for 70 percent of the overall scoring as directed by the Governor's Congestion Mitigation Task Force. The rationalization for this is that both system management and demand management projects have much higher priorities than system expansion projects, since management generally involves easier and cheaper alternatives. Available funding is allocated to all of these types of projects before system expansion. The technical analysis of system expansion projects includes the following criteria and their associated weights:

1. Recurring Delay – 50 percent
2. Non-Recurring Delay – 20 percent
3. Environmental Impact – 15 percent
4. Regional Development Plan Policy Support – 15 percent

Points also are established within each of the four components, and each project receives an overall score for the combined points from each of the criteria. In addition, benefit/cost analyses are prepared for each project after determining the technical score to provide additional prioritization of each project type. After projects are evaluated technically, they are further evaluated for funding and placed into one of the following tiers:

1. RTP and TIP Project List – Financially constrained list
2. "Unfunded Needs" Project List – Funding currently unavailable, but still a regional priority
3. Aspirations Plan Project List – Proposed future projects that are not a regional priority

The eight federal SAFETEA-LU planning factors also were incorporated into the RTP planning process, with some being directly included as project evaluation criteria. Further details of the ARC prioritization process are provided in **Appendix D**.

3.5 Maricopa Association of Governments

MAG is a Council of Governments (COG) that serves as the designated MPO for transportation planning in the Maricopa County region of Arizona, which includes Maricopa County, the City of Phoenix, and 25 other incorporated cities and towns within the county. MAG conducts long-range planning relative to freeways, arterials, safety, bicycle/pedestrian facilities, and transit facilities.

The Regional Transportation Plan (RTP) typically includes approximately 500 projects while the five-year Transportation Improvement Program (TIP) typically includes approximately 2,000 projects with the addition of local projects. A typical annual TIP budget is approximately $1.2 billion per year. Projects are categorized based on type of mode. Funding allocation is determined based on sales tax legislation. Current funding has been allocated as follows—57 percent for freeway, 33 percent for transit, and 10 percent for arterial projects. With regards to bicycle/pedestrian and safety projects, they are not in the

RTP, but rather are programmed annually in the TIP. RTP projects are prioritized by MAG staff with the assistance of a Transportation Review Committee (city engineers and planners) based on a ranking methodology established in 2004. The ranked program is then submitted to a Management Committee (city managers), followed by the Transportation Policy Committee (elected officials and private sector representatives), and finally the Regional Council (representatives from each member agency) for approval.

The project ranking process was applied to the 2003 RTP but has not been updated since, given that a limited budget has precluded MAG from undertaking a major RTP update. In total, it took about two years to develop consensus and approve the transportation program. A number of evaluation criteria consistent with regional goals are used for each project category to prioritize each project. The prioritization methodology does not use a point-based system but rather a subjective evaluation of the following criteria:

1. Extent of local public and private funding participation
2. Social and community impacts
3. Establishment of a complete transportation system for the region
4. Construction of projects to serve regional transportation needs
5. Construction of segments that provide connectivity with other elements of the regional transportation system
6. Other relevant criteria developed by the regional planning agency

The eight federal SAFETEA-LU planning factors also were incorporated into the RTP planning process, with some being directly included as project evaluation criteria. Further details of the MAG prioritization process are provided in **Appendix D**.

3.6 Denver Regional Council of Governments

DRCOG is the designated MPO for transportation in the Denver region, which includes Adams, Arapahoe, Boulder, Clear Creek, Douglas, Gilpin, and Jefferson Counties; the City and County of Broomfield; the City and County of Denver; and southwest Weld County. DRCOG works with the Colorado Department of Transportation (CDOT), Regional Transportation District (RTD), and others to prepare transportation plans and programs. DRCOG conducts long-range planning related to transportation, land use/development, open space, and water quality.

The Transportation Improvement Program (TIP), which is updated every four years, currently includes approximately 200 projects using federal and state funds as well as local transit funding. The overall annual budget for the TIP is approximately $610 million to $660 million, which includes $300 million in local transit funding. TIP projects, which can include highway, transit, bicycle/pedestrian, and air quality projects, are currently prioritized by three different agencies—DRCOG, CDOT, and RTD—based on the proposed funding source. DRCOG evaluates projects using Surface Transportation Program (STP)-Metro, STP-Enhancement, and CMAQ funds. CDOT evaluates projects using state and other federal highway funds

while the RTD evaluates projects for other federal transit funds and local transit funds. Projects from all three agencies are then integrated into a draft TIP by DRCOG staff, which is posted for public hearing and reviewed by the Transportation Advisory Committee and Regional Transportation Committee. Finally, the TIP is submitted to the DRCOG Board of Directors for approval and adoption.

Projects submitted to the DRCOG for inclusion in the TIP are further separated into categories based on project type:

- Roadway capacity projects
- Roadway operational improvements
- Roadway reconstruction
- Rapid transit
- Transit passenger facilities
- New bus service
- Bicycle/pedestrian projects
- Other enhancement projects
- Air quality improvement projects
- Transportation studies
- Congestion management programs/pools (including transportation demand management, traffic signal systems, and ITS)

Projects are evaluated by DRCOG staff based on an established point-based ranking system for each category. The total possible score for each project is 100 points. DRCOG has used a prioritization process since the early 1980s. DRCOG staff typically spends about two months ranking projects. Typically, it takes an additional three to four months to build consensus on the prioritized list and go through the public hearing and approval process. The overall prioritization process is reviewed every four years as part of the TIP updates. The projects are ranked and prioritized under each category on the point-based scoring system using specific evaluation criteria approved by each committee and board.

During the first phase of project selection for the TIP, 75 percent of the not-yet-programmed funding is allocated directly to projects with the highest scores. During the second phase of project selection, 25 percent of the not-yet-programmed funding is allocated to additional projects based on the following qualitative criteria:

- Financial equity of project awards among DRCOG members at the county level
- Potential cost savings from merging projects
- Projects in strategic corridors
- Project readiness for construction
- Projects in very small communities

Further details of the DRCOG prioritization process are provided in **Appendix D**.

3.7 Sacramento Area Council of Governments

SACOG is an association of local governments in the six-county Sacramento, California region. Its members include the Counties of El Dorado, Placer, Sacramento, Sutter, Yolo, and Yuba as well as 22 cities within the region, with a population of approximately 2,056,900 people. SACOG prepares the region's long-range transportation plan and assists in planning for transit, bicycle networks, clean air, and airport land uses.

The Metropolitan Transportation Plan (MTP) is a 28-year long-range plan updated every four years to identify transportation improvements based on projections for growth in population, housing, and jobs. In addition to preparing the MTP, SACOG develops a Metropolitan Transportation Improvement Program (MTIP) which is updated every two years. In the most recent MTP, there were more than 1,400 projects identified with a total budget of $41.7 billion for the 28-year plan.

During development of the most recent MTP, technical and advisory committees comprised of local public works agencies, transit operators, local planning staff, and advocates made recommendations regarding investment priorities to be considered by the Board of Directors. The collaborations with local agency partners included the development of county-scale transportation scenarios for each county participating in SACOG and reflected different emphases on specific investments in roads, transit, bicycle and pedestrian modes, and transportation programs. Citizen feedback on priority investments was gathered through a robust public involvement process including more than 150 presentations, 17 community workshops, and an Elected Officials Summit.

Following this effort, SACOG staff and agency partners combined the most popular and well-performing county investment priorities into regional scenarios and tested the scenarios against a number of performance measures. Projects nominated by local agencies were then analyzed against the citizen priorities identified through the public outreach, technical performance, and financial constraint requirements.

SACOG has seven funding programs that were established as part of the adoption of the region's MTP in 2002. They include the following:

- Air quality funding program
- Bicycle/pedestrian funding program
- Community design funding program
- Transportation demand management funding program
- Regional/local funding program
- Road rehabilitation funding program
- Transit funding program

The transit funding program is used for projects programmed with FTA funds. All other funding programs are funded with a combination of federal CMAQ funds, STP funds, and funds from the State Transportation Improvement Program (STIP) process. Projects are categorized based on the applicable funding sources and then evaluated using the prioritizing process.

SACOG works in coordination with the state, transit operators, and local agencies to prioritize the projects. These recommendations then go through a designated interagency consultation group, known as the Regional Planning Partnership, and then are forwarded to SACOG's Transportation Committee and subsequently to the SACOG Board. SACOG has had an established prioritization process for at least ten years. The development of the current MTP took more than two years due to extensive public involvement and local agency partner review. In addition, the MTIP process typically ranges from three to six months. The prioritization process is reviewed every two years as part of the MTIP updates and every four years as part of MTP updates.

Depending on the funding program, projects can be prioritized based on an established point based ranking methodology out of a total possible 100 point scale. Prioritization of the investment scenarios is based on the following six guiding principles adopted by the SACOG Board of Directors in 2005:

1. Smart land use
2. Environmental quality and sustainability
3. Financial stewardship
4. Economic vitality
5. Access and mobility
6. Equity and choice

Further details of the SACOG prioritization process are provided in **Appendix D**.

3.8 Strengths, Weaknesses, and Lessons Learned

One of the most important reasons for interviewing each benchmark agency was to identify any recognized strengths and weaknesses of the respective methodologies and then document the "lessons learned" when developing the Hampton Roads methodology.

The most common strength observed among the benchmark agencies was the presence of regional agreement and consensus of all participating agencies. This allowed the methodologies to be transparent and brought all stakeholders to the same level. Additionally, by obtaining consensus, opportunities for both stakeholder and public input are generated. It also was noted that maintaining a consensus-driven methodology allowed for the rules to be clearly defined. Benchmarks also indicated that by using an electronic (or web-based) scoring tool, insight could be provided into how a project could be improved to receive a higher score. The use of a very data-driven and systematic methodology was identified as an additional strength of the benchmark methodologies.

In addition to strengths, the six benchmark agencies also identified a number of recognized weaknesses throughout the development of their prioritization methodologies. The most common weakness pertains to the data inputs necessary to score the projects. Subjective MOEs, the difficulty in accurately estimating project costs, and trying to balance the amount of time/effort needed to obtain specific data were all identified as major weaknesses. Another data input weakness noted was the inability to accurately forecast future conditions. Furthermore, a difficult and complex methodology would require significant reeducation of both new and existing applicants each time a revision is made, as the type of data required from the individual localities changes to address current issues.

The Hampton Roads Program Prioritization Process will incorporate lessons learned from both the strengths and weaknesses identified by the benchmark agencies. First, complete disclosure of all assumptions and decisions will be made between the Steering Committee, TTAC, and HRTPO Board to ensure that the methodology remains transparent and open to both stakeholder and public input. Secondly, the Hampton Roads methodology will be applied in a very common, easy to use, and convenient manner—an electronic spreadsheet (Excel) format. The spreadsheet will provide detailed output for each project so that the user can identify individual evaluation criteria for which a project is not receiving many points. The methodology will be as user-friendly as possible with dropdown menus and commented descriptions of what each input or output is. Changes to MOEs will be simple modifications within the spreadsheet with internal checks to ensure that all weighting factors sum to 100. An application form will be developed such that each applicant understands which information will be required by each agency in order to submit strong projects that meet the established criteria to achieve optimal scores.

With respect to data inputs, the Hampton Roads methodology will use as many data driven inputs as possible to eliminate sources of subjectivity. It is understood that removing full subjectivity from the prioritization process is unattainable and impractical. Therefore, distinct rules will be established to provide guidance on the level of subjectivity used. Also, it will be recommended that all subjective input reviews be performed by an impartial committee (that has not yet been formed). Finally, cumbersome and tedious data that would result in little additional improvement to project scoring are not recommended to be used.

4. Project Category and Evaluation Criteria Development

Once all research was completed, the next step in the prioritization process (Phase I - Project Tool Development) was to establish a set of groups or categories to evaluate similar projects separately. It was acknowledged that comparisons should only be made between similar projects, allowing consideration of unique categories and specific attributes. Developing categories also brings the projects into better alignment with potential primary funding sources. Within each of the categories, all utility, viability, and economic vitality criteria pertinent to that category were developed. While some criteria were unique to a single category, other criteria were common to all categories. However, actual measurement of the criteria is specific to each project.

The inherent challenge in determining the appropriate number of criteria was to find a balance between having too many criteria, which could reduce or dilute the significance of any one, while also ensuring that all important aspects of each project category are considered in the scoring. Initial categories and evaluation criteria were developed by Kimley-Horn based on a review of the methodologies from the benchmark agencies as outlined in Chapter 3. The evaluation criteria within each category were reviewed against the eight Federal Planning Factors to ensure there was a direct correlation. **Figure 5** summarizes the project categories and their correlation to the eight Federal Planning Factors based on the individual evaluation criteria contained within each category. **Appendix A** provides further detail on how the eight Federal Planning Factors were considered in the prioritization process. The categories and criteria were then presented to the TTAC before being officially endorsed and agreed to by the HRTPO Board on July 21, 2010.

Planning Factor	Highways	Bridge/Tunnel	Bike and Ped	Transit	Sys Mngmt/ TDM/Op. Imp	Intermodal
Support the Economic Vitality of the Metropolitan Area	✓	✓		✓		✓
Increase Safety for Motorized and Non-Motorized Users	✓	✓	✓		✓	✓
Support Homeland Security	✓	✓			✓	
Accessibility and Mobility of People and Frieght	✓	✓	✓	✓	✓	✓
Environment, Conservation, Quality of Life, Planned Growth & Economic Development Patterns	✓	✓	✓	✓	✓	✓
Enhance Connectivity Across and Between Modes, for People and Freight	✓	✓	✓	✓		✓
Management and Operations	✓	✓		✓	✓	✓
Preservation of Existing Transportation Network	✓	✓			✓	

Figure 5 - Eight Federal Planning Factors Evaluation

4.1 Project Categories

In developing the project categories, heavy reliance was placed on the methodologies currently used by the HRTPO for CMAQ, RSTP, and LRTP; by VDOT; and by the six benchmark agencies. Project categories from each of the ten methodologies were recorded, and the frequencies of each category were tallied. Project category frequency results are included below in **Figure 6**, which shows how many times a specific category appeared amongst the ten agencies researched.

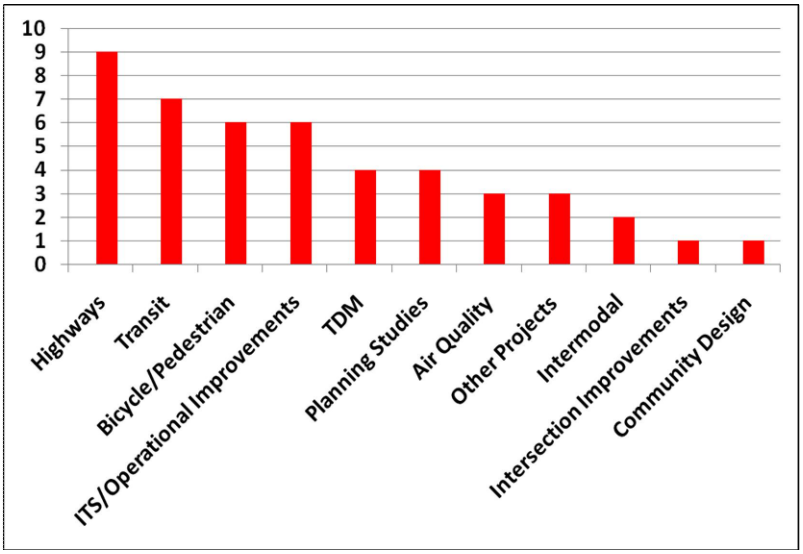

Figure 6 - Project Category Frequency amongst Researched Agencies

The initial project category recommendation for the Hampton Roads Program Prioritization methodology focused on selecting categories that appeared in a minimum of three benchmark agencies, which included the following six categories: "Highways," "Transit," "Bicycle and Pedestrian," "ITS/Operational Improvements," "TDM," and "Planning Studies." However, through discussions with the Steering Committee and TTAC, it was determined that "TDM" projects could be included with "Intersection Improvements" (formerly "Operational Improvements") and "Systems Management" (formerly "ITS") projects to form one separate category. The "Planning Studies" category was excluded as the consensus of the Steering Committee was that standalone planning projects are not in the LRTP. Furthermore, the planning phase of a potential LRTP project is completed before becoming part of the LRTP. The "Intermodal" category was determined to include both airport and seaport projects. Lastly, given the number of water crossings throughout the Hampton Roads region, there are a significant number of bridges and tunnels. It was recognized that these types of structures are extremely costly and that it would not be reasonable to have a "Bridge/Tunnel" project compete directly with a "Highways" project. Therefore, a separate "Bridge/Tunnel" category was established.

The following list briefly describes the types of projects included within the six approved categories:

1) **"Highways" Projects**: *"Highways" projects will include the full spectrum of roadways (interstate, arterial/state highway, and local). Although each has different levels of functionality, the governing criteria for their functionality are the same. While the current version of the tool scores all "Highways" projects with the same methodology, it does have the capability to sort projects by functional classification. This allows the user to compare a subsection of "Highways" projects if, for example, a certain roadway funding source is specific to a functional classification.*

2) **"Bridge/Tunnel" Projects**: *Projects placed in this category will have a primary focus on a bridge or tunnel structure, while it was recognized that each of these projects also will have some type of*

roadway facility associated with it. Significant lengths of roadway included to either side of the structure do not prevent the project from being included within this category, as long as the primary focus of the project is the actual bridge/tunnel structure.

3) **"Bicycle and Pedestrian" Projects:** *Projects included in this category include bicycle and pedestrian facilities such as bike paths, bikeways, and multiuse path projects, along with any other projects which accommodate bicycle or walking modes of transportation.*

4) **"Systems Management / Transportation Demand Management (TDM) / Operational Improvements" Projects:** *These projects include the most diverse types of projects, ranging from transportation demand management (such as ridesharing), signal system design, corridor signal timing projects, and any other project which would qualify as an ITS project at either a local or statewide level.*

5) **"Transit" Projects:** *"Transit" projects include rail guideways, bus service, intercity rail, or any other projects involving the movement of a significant number of people where the primary mode is other than personally owned vehicles (POV), bicycle, or walking, excluding multimodal (these are included under the "Intermodal" category).*

6) **"Intermodal" Projects:** *"Intermodal" projects include projects which ease the transition of goods or passengers between two or travel modes. Given the heavy port influence in Hampton Roads, these types of projects most commonly involve the movement of freight (e.g., from road to air, rail, and/or sea).*

4.2 Project Evaluation Criteria - "Highways"

Throughout the CMAQ, RSTP, LRTP, VDOT, and benchmark agency literature reviews, more than 35 criteria were observed for "Highways" projects. From that list, there were 12 criteria which were common amongst at least three agencies *(Existing and Future Congestion Levels, Safety, Cost Effectiveness, Multimodal Enhancements, Infrastructure Condition, Additional Funding Availability, Air Quality/Emissions Reduction, Travel Demand/ADT, System Continuity, Environmental Impacts, Project Viability,* and *Social/Community Impacts).* After observing commonalities amongst each of the researched agencies, it was determined that the criteria below would yield the most beneficial projects to the Hampton Roads region. A brief description regarding MOEs is included for each criterion. As previously described, the challenge is in identifying the appropriate number of criteria which will achieve the end result. For instance, if all 12 criteria were weighted evenly from 100 available points, each criterion would only be worth approximately eight points. Information concerning how the criteria will be weighed and measured is described in more detail in Chapters 5 and 6, respectively.

Project Utility Criteria:

- ***Congestion Level:*** *Existing and future levels of congestion will be captured and compared through V/C ratios obtained from the LRTP.*

- ***System Continuity and Connectivity****: This criterion will take into account the extent to which Hampton Roads is directly affected by the project, ranging from regionally as a whole to just locally within a municipality.*
- ***Cost Effectiveness****: This criterion is in the form of a ratio representing the total cost of the project per vehicle-mile traveled (VMT), in dollars/VMT.*
- ***Existing and Future Land Use Compatibility****: This criterion examines the compatibility of the project relative to adjacent land uses. Given the wide range of documentation possible to establish compatibility, points are awarded based on documentation that has been approved by an agency's elected body (such as a Comprehensive Plan).*
- ***Safety and Security****: This criterion is based on the critical crash ratio (CCR) within the project area, corrections to any existing geometric deficiencies, and the extent of impact to incident management/evacuation routes.*
- ***Infrastructure Condition****: This criterion is based on the score received on the Critical Condition Index (CCI), which is a process used to classify pavement conditions of roadways.*
- ***Modal Enhancements****: Projects are awarded points if they include any bicycle and pedestrian, transit, HOV, TDM/ITS, or intermodal accommodations and considerations.*

Project Viability Criteria:

- ***Amount of additional local match or private funding committed to the project:*** *Projects are awarded points if there are any additional local or private funds (such as private funds (e.g., Public-Private Transportation Act), tolls, or additional local matches) committed to the project beyond the required match.*
- ***Prior Commitment:*** *This criterion classifies whether a project has prior commitment such as inclusion in the LRTP.*
- ***Federal Mandates:*** *This criterion is based on whether a project is backed by federal mandates. Emergency bridge replacements, projects addressing significant existing design deficiencies, and projects with soon to expire federal funding previously allocated to the project are a few examples of federally mandated projects.*
- ***Degree of Project Readiness:*** *This criterion assesses how quickly a project could begin construction by determining whether the project has its plans complete and is ready for advertisement, whether the necessary environmental permits are complete, and whether the project is completely funded.*

Economic Vitality Criteria:

- ***Total Reduction in Travel Time:*** *This criterion is based on research suggesting that the majority of monetized benefits that result from an investment in new transportation infrastructure are a direct result of travel time savings. Travel time savings enable increased productivity, resulting in a more competitive environment for regional businesses.*

- ***Labor Market Access:*** *Increasing access to the region's labor force through improved transportation infrastructure is a critical component in providing business and industry with the access to human capital that is vital to their success. Efficient access to labor markets for residents increases efficiency, productivity, and quality of life.*

- ***Addresses the Needs of Basic Sector Industries:*** *Basic sector industries are those that bring outside dollars into the region, creating new income and additional spending power in the regional economy, thus providing the foundation of the regional economy. Increasing the competitiveness in a basic sector industry that is built on a regional competitive advantage is vital in ensuring continued success both within the basic sector industry and to the entire regional economy.*

- ***Increases Opportunity:*** *This criterion measures the ability of a project to meet the needs of jurisdictional comprehensive plans and areas that are designated as planned growth areas within the region. It also evaluates the ability of a project to develop access to new opportunities for growth.*

4.3 Project Evaluation Criteria – "Bridge/Tunnel"

In most of the CMAQ, RSTP, VDOT, and benchmark literature reviews, bridge and/or tunnel projects were included with the "Highways" projects. However, given the nature of Hampton Roads with the high number of water crossings compounded by the aging infrastructure, it was determined that bridge and/or tunnel projects should have a separate category. While the evaluation criteria are the same as those used in "Highways," the details associated with the MOEs are different. Furthermore, costs associated with structures are significantly higher than those of highways, which was another driving factor to separate "Bridge/Tunnel" from "Highways." Evaluation criteria for "Bridge/Tunnel" projects used in the proposed methodology include:

Project Utility Criteria:

- ***Congestion Level****: Existing and future levels of congestion will be captured and compared through V/C ratios obtained from the LRTP.*

- ***System Continuity and Connectivity****: This criterion will take into account the extent to which Hampton Roads is directly affected by the project, ranging from regionally as a whole to just locally within a municipality.*

- ***Cost Effectiveness****: This criterion is in the form of a ratio representing the total cost of the project per VMT, in dollars/VMT.*
- ***Existing and Future Land Use Compatibility****: This criterion examines the compatibility of the project relative to adjacent land uses. Given the wide range of documentation possible to establish compatibility, points are awarded based on documentation that has been approved by an agency's elected body (such as a Comprehensive Plan).*
- ***Safety and Security****: This criterion is based on the CCR within the project area, corrections to any existing geometric deficiencies, the extent of impact to incident management/evacuation routes, and the failure impact to traffic (volume and length of detour) if the structure fails.*
- ***Infrastructure Condition****: The "Bridge/Tunnel" infrastructure condition criterion is further refined within the category based on the type of structure. For bridge projects, this criterion is based on the Bridge Sufficiency Rating, which takes into account factors for structural condition, bridge geometry, and traffic considerations. The sufficiency rating formula is contained in the December 1995 edition of the "Recording and Coding Guide for the Structure Inventory and Appraisal of the Nation's Bridges." For tunnel projects, this criterion takes into account the age of the structure, the number of years since the last major improvement (in excess of $5 million), and the current cost of repairs needed on the structure.*
- ***Modal Enhancements****: Projects are awarded points if they include any bicycle and pedestrian, transit, HOV, TDM/ITS, or intermodal accommodations and considerations.*

Project Viability Criteria:

- ***Amount of additional local match or private funding committed to the project:*** *Projects are awarded points if there are any additional local or private funds (such as private funds (e.g., Public-Private Transportation Act), tolls, or additional local matches) committed to the project beyond the required match.*
- ***Prior Commitment:*** *This criterion classifies whether a project has prior commitment such as inclusion in the LRTP.*
- ***Federal Mandates:*** *This criterion is based on whether a project is backed by federal mandates. Emergency bridge replacements, projects addressing significant existing design deficiencies, and projects with soon to expire federal funding previously allocated to the project are a few examples of federally mandated projects.*
- ***Degree of Project Readiness:*** *This criterion assesses how quickly a project could begin construction by determining whether the project has its plans complete and is ready for advertisement, whether the necessary environmental permits are complete, and whether the project is completely funded.*

Economic Vitality Criteria:

- ***Total Reduction in Travel Time:*** *This criterion is based on research suggesting that the majority of monetized benefits that result from an investment in new transportation infrastructure are a direct result of travel time savings. Travel time savings enable increased productivity, resulting in a more competitive environment for regional businesses.*

- ***Labor Market Access:*** *Increasing access to the region's labor force through improved transportation infrastructure is a critical component in providing business and industry with the access to human capital that is vital to their success. Efficient access to labor markets for residents increases efficiency, productivity, and quality of life.*

- ***Addresses the Needs of Basic Sector Industries:*** *Basic sector industries are those that bring outside dollars into the region, creating new income and additional spending power in the regional economy, thus providing the foundation of the regional economy. Increasing the competitiveness in a basic sector industry that is built on a regional competitive advantage is vital in ensuring continued success both within the basic sector industry and to the entire regional economy.*

- ***Increases Opportunity:*** *This criterion measures the ability of a project to meet the needs of jurisdictional comprehensive plans and areas that are designated as planned growth areas within the region. It also evaluates the ability of a project to develop access to new opportunities for growth.*

4.4 Project Evaluation Criteria – "Bicycle and Pedestrian"

The benchmark and literature reviews identified more than 25 different criteria pertinent to "Bicycle and Pedestrian" projects. From this list, there were five criteria which were common amongst at least three agencies *(Cost Effectiveness, Air Quality Benefits/Emissions Reduction, Additional Funding Availability, Safety,* and *System Continuity and Connectivity).* However, after observing commonalities amongst each of the researched agencies, it was determined that the following criteria would yield the most beneficial projects to the Hampton Roads region:

Project Utility Criteria:

- ***System Continuity and Connectivity****: There are four components to this criterion. The first is the extent to which Hampton Roads is directly affected by the project, ranging from regionally as a whole to just locally within a municipality. Second is whether the project would eliminate a major barrier such as crossing a busy roadway or body of water. The third component is whether the project connects to an existing bicycle or pedestrian facility. The last component takes into account how many regional destinations the project would provide access to (such as schools, commercial employment centers, recreation facilities, or high density residential areas).*

- ***Safety****: This criterion awards points to projects based on the number of crashes that have occurred between vehicles and pedestrians or bicycles in the last three years as well as to projects that will address an existing safety concern.*
- ***Cost Effectiveness****: This criterion is in the form of a ratio representing the total cost of the project per population served within a 1.5-mile radius of the project, in dollars/person.*
- ***Enhancements to Other Categories****: Projects are awarded points if they include any transit, highways/bridge/tunnel, TDM/ITS, or intermodal considerations.*
- ***Existing and Future Land Use Compatibility****: This criterion examines the compatibility of the project relative to adjacent land uses. Given the wide range of documentation possible to establish compatibility, points are awarded based on documentation that has been approved by an agency's elected body (such as a Comprehensive Plan).*

Project Viability Criteria:

- ***Amount of additional local match or private funding committed to the project:*** *Projects are awarded points if there are any additional local or private funds (such as private funds (e.g., Public-Private Transportation Act) or additional local matches) committed to the project beyond the required match.*
- ***Prior Commitment:*** *This criterion classifies whether a project has prior commitment such as inclusion in a comprehensive plan.*
- ***Federal Mandates:*** *This criterion is based on whether a project is backed by federal mandates. Emergency bridge replacements, projects addressing significant existing design deficiencies, and projects with soon to expire federal funding previously allocated to the project are a few examples of federally mandated projects.*
- ***Degree of Project Readiness:*** *This criterion assesses how quickly a project could begin construction by determining whether the project has its plans complete and is ready for advertisement, whether the necessary environmental permits are complete, and whether the project is completely funded.*

CMAQ funds are one source of funding for bicycle and pedestrian projects. HRTPO's CMAQ scoring process has been well-accepted among the member localities.

4.5 Project Evaluation Criteria – "Systems Management/Transportation Demand Management/Operational Improvements"

Under this category, there is a widespread range of project types, with each having numerous criteria associated with it. It was generally observed through the literature reviews that "Systems Management" and "Operational Improvement" projects have similar attributes common amongst at least two agencies

(Improvements to Peak Hour Traffic Flow, Air Quality/Emissions Reduction, Additional Funding Availability, Mobility/Accessibility, Improvements to Various Operating Agencies, Component of the Regional ITS Plan, and *Safety)*. However for "TDM" projects, the literature reviews revealed that these project types required a unique set of criteria including *Number of Employers Offering TDM Programs, Percent of Employees Ridesharing, Percent of Employees Walking/Biking, Parking Management,* and *Vehicle Occupancy Rates,* which are not easily applied to the other projects. Therefore, it was decided that "TDM" projects would have additional criteria, applicable to only those projects. This would allow some overlap in the overall category with "TDM" projects requiring one additional step to determine an overall score. The exact weighting within this category will be discussed in more detail in Chapter 5. The final approved criteria for "Systems Management/TDM/Operational Improvements" projects are as follows:

Project Utility Criteria:

- ***Congestion Level****: This criterion represents the existing congestion level only within the area the project serves, as classified in the LRTP (low, moderate, or severe).*
- ***Cost Effectiveness****: This criterion is in the form of a ratio representing the total cost savings per user of the project per dollar spent of the total cost.*
- ***Air Quality****: This criterion is based on the total amount of emissions (tons of VOC and NOx) reduced if the project is constructed.*
- ***Safety:*** *Projects are awarded points if they improve an evacuation or incident management route, include emergency preemption or incident detection, or reduce the number of crashes.*
- ***Regional Significance****: Projects are awarded points if they address mobility or accessibility needs of the Hampton Roads region, improve communications among various operating agencies, or are part of the Regional ITS Strategic Plan.*
- ***Enhancements to Other Categories:*** *Projects are awarded points if they include any transit, highways/bridge/tunnel, bicycle and pedestrian, or intermodal accommodations and considerations.*

Project Utility Criteria for "TDM" Projects *Only*:

- ***Employers Offering* TDM *Programs****: This criterion represents the number of additional employers offering TDM programs if the project is implemented.*
- ***Employee Ridesharing Participation****: This criterion represents the percentage of employees who would participate in ridesharing initiatives if the project is implemented.*
- ***Employee Walk/Bike Participation****: This criterion represents the percentage of employees who would walk or bike to work instead of using a POV if the project is implemented.*
- ***Parking Management****: This criterion awards points to projects which will incorporate parking management initiatives.*

Project Viability Criteria:

- ***Amount of additional local match or private funding committed to the project:*** *Projects are awarded points if there are any additional local or private funds (such as private funds (e.g., Public-Private Transportation Act), tolls, or additional local matches) committed to the project beyond the required match.*

- ***Prior Commitment:*** *This criterion classifies whether a project has prior commitment such as inclusion in an official document.*

- ***Federal Mandates:*** *This criterion is based on whether a project is backed by federal mandates. Emergency bridge replacements, projects addressing significant existing design deficiencies, and projects with soon to expire federal funding previously allocated to the project are a few examples of federally mandated projects.*

- ***Degree of Project Readiness:*** *This criterion assesses how quickly a project could begin construction by determining whether the project has its plans complete and is ready for advertisement, whether the necessary environmental permits are complete, and whether the project is completely funded.*

4.6 Project Evaluation Criteria – "Transit"

More than 35 unique evaluation criteria were identified throughout the literature reviews for "Transit" projects. From the criteria list, there were five criteria which were common amongst at least three agencies *(Cost Effectiveness, Air Quality Benefits, Traffic Congestion Relief, Additional Funding Availability,* and *Usage/Ridership).* Through discussions with HRT and WATA, additional criteria were discussed to provide consistency with the federal guidelines outlined specifically for transit *(User Benefit, Land Use Compatibility,* and *Enhancements to other Categories).* The following criteria were chosen to be the most critical in evaluating all types of "Transit" projects:

Project Utility Criteria:

- ***Usage****: For new projects this criterion is based on the estimated proposed ridership to result from the project, whereas existing projects are based on the existing ridership of the project.*

- ***System Continuity and Connectivity****: This criterion will take into account the extent to which Hampton Roads is directly affected by the project, ranging from regionally as a whole to just locally within a municipality, as well as the extent to which the project will improve access to freight distribution facilities, ports, major industrial clients, or employment and population centers.*

- ***User Benefit****: This criterion is in the form of a ratio representing the annual travel time savings per annual rider, in hours/person.*

- ***Existing and Future Land Use Compatibility****: This criterion examines the compatibility of the project relative to adjacent land uses. Given the wide range of documentation possible to establish compatibility, points are awarded based on documentation that has been approved by an agency's elected body (such as a Comprehensive Plan).*
- ***Cost Effectiveness****: This criterion is in the form of a ratio representing the total annualized cost of the project per user (annual riders), in dollars/person.*
- ***Air Quality****: This criterion is based on the total amount of emissions (VOC and NOx) reduced if the project is constructed, in tons.*
- ***Enhancements to Other Categories****: Projects are awarded points if they include any TDM/ITS, highways/bridge/tunnel, bicycle and pedestrian, or intermodal accommodations and considerations.*

Project Viability Criteria:

- ***Amount of additional local match or private funding committed to the project:*** *Projects are awarded points if there are any additional local or private funds (such as private funds (e.g., Public-Private Transportation Act), tolls, or additional local matches) committed to the project beyond the required match.*
- ***Prior Commitment:*** *This criterion classifies whether a project has prior commitment such as inclusion in the LRTP.*
- ***Federal Mandates:*** *This criterion is based on whether a project is backed by federal mandates. Emergency bridge replacements, projects addressing significant existing design deficiencies, and projects with soon to expire federal funding previously allocated to the project are a few examples of federally mandated projects.*
- ***Degree of Project Readiness:*** *This criterion assesses how quickly a project could begin construction by determining whether the project has received FTA approval for final design or environmental clearance.*

Economic Vitality Criteria:

- ***Labor Market Access:*** *Increasing access to the region's labor force through improved transportation infrastructure is a critical component in providing business and industry with the access to human capital that is vital to their success. Efficient access to labor markets for residents increases efficiency, productivity, and quality of life.*
- ***Addresses the Needs of Basic Sector Industries:*** *Basic sector industries are those that bring outside dollars into the region, creating new income and additional spending power in the regional economy, thus providing the foundation of the regional economy. Increasing the competitiveness*

in a basic sector industry that is built on a regional competitive advantage is vital in ensuring continued success both within the basic sector industry and to the entire regional economy.

- ***Increases Opportunity:*** *This criterion measures the ability of a project to meet the needs of jurisdictional comprehensive plans and areas that are designated as planned growth areas within the region. It also evaluates the ability of a project to develop access to new opportunities for growth.*

- ***Economic Distress Factors:*** *Ensuring labor market access and increasing the opportunity for those residing in distressed areas is vital in increasing the region's economic vitality. The provision of transportation alternatives for those with limited means results in greater access to goods, services, and the labor market, thus removing barriers and improving quality of life.*

4.7 Project Evaluation Criteria – "Intermodal"

"Intermodal" projects had more than ten unique evaluation criteria identified through the literature reviews. From these, there were four which were common to multiple agencies *(Modal Enhancements/Multimodal Accommodations, Better Accommodates Intermodal Movements, Improves Rail or Vehicular Access,* and *Project Readiness/Funding Availability/Prior Commitment/Federal Mandates).* After extensive review, the following criteria were selected to evaluate "Intermodal" projects:

Project Utility Criteria:

- ***Intermodal Movement Accommodation****: This criterion is based on the conflicts created between the intermodal movements and other modes (e.g., no conflict projects such as a grade separated rail crossing, limited conflict projects involving the crossing of a low volume roadway, or full conflict projects involving the crossing of a high volume roadway).*

- ***Access Improvements (Rail or Vehicular)****: Points are awarded to projects which improve access to freight distribution facilities, airports/seaports, major industrial clients, employment and population centers, or rail stations/terminals based on the regional impact of the access.*

- ***Cost Effectiveness:*** *A detailed MOE for this evaluation criterion has not been developed at this point. The Steering Committee will continue to work closely with the VPA to develop an appropriate MOE.*

- ***Enhancements to Other Categories****: Projects are awarded points if they include any TDM/ITS, highways/bridge/tunnel, bicycle and pedestrian, or transit considerations.*

Project Viability Criteria:

- ***Amount of additional local match or private funding committed to the project:*** *Projects are awarded points if there are any additional local or private funds (such as private funds (e.g., Public-Private Transportation Act), tolls, or additional local matches) committed to the project beyond the required match.*

- ***Prior Commitment:*** *This criterion classifies whether a project has prior commitment such as inclusion in the LRTP.*

- ***Federal Mandates:*** *This criterion is based on whether a project is backed by federal mandates. Emergency bridge replacements, projects addressing significant existing design deficiencies, and projects with soon to expire federal funding previously allocated to the project are a few examples of federally mandated projects.*

- ***Degree of Project Readiness:*** *This criterion assesses how quickly a project could begin construction by determining whether the project has its plans complete and is ready for advertisement, whether the necessary environmental permits are complete, and whether the project is completely funded.*

Economic Vitality Criteria:

- ***Total Reduction in Travel Time:*** *This criterion is based on research suggesting that the majority of monetized benefits that result from an investment in new transportation infrastructure are a direct result of travel time savings. Travel time savings enable the more efficient movement of freight, resulting in increased productivity and a more competitive environment for regional businesses.*

- ***Labor Market Access:*** *Increasing access to the region's labor force through improved transportation infrastructure is a critical component in providing business and industry with the access to human capital that is vital to their success. Efficient access to labor markets for residents increases efficiency, productivity, and quality of life.*

- ***Impact on Truck Movement:*** *As truck movement is an integral component of intermodal projects, it is imperative to reduce congestion and improve the flow of traffic on freight corridors. Reducing the travel time on roadways with high volumes reduces the economic choke points associated with intermodal movement.*

- ***Improves Interaction between Modes of Travel:*** *An improved system of transfer between modes of transportation improves efficiency and productivity for businesses throughout the region. This criterion measures the ability of a new project to aid the transition between modes of travel in the region, including rail, airports, and seaports.*

- ***Increases Opportunity:*** *This criterion measures the ability of a project to meet the needs of jurisdictional comprehensive plans and areas that are designated as planned growth areas within the region. It also evaluates the ability of a project to develop access to new opportunities for growth.*

4.8 Application of Categories

The primary reason for the development of this prioritization methodology was to assist in creating a tool for use in the LRTP development. However, it also was an opportunity to examine prioritization, in its many forms, from around the country. LRTPs are designed to individually list those projects that are deemed regionally significant. The 2030 Hampton Roads LRTP made a distinction between "individually listed" and "not individually listed" projects[16]. Individually listed projects in the 2030 Hampton Roads LRTP included lane additions on highways classified as arterial and higher, bridge replacements, major interchange work, and fixed guideway transit projects. All other types of work (e.g., bike lanes, turn lanes, ITS, widening of collector and local roadways, regular bus routes, etc.) were not listed individually in the LRTP but rather were included as a group and still accounted for in the financial constraint of the 2030 LRTP. A similar concept and definition of "individual" versus "grouped" projects is being used for the 2034 LRTP, currently in development.

The "Highways," "Bridge/Tunnel," "Transit" (specifically fixed guideway), and "Intermodal" categories fit well with the types of projects which are individually listed in the LRTP. The "Bicycle and Pedestrian" and "Systems Management/TDM/Operational Improvements" types of projects would generally fall into the grouped project category, meaning that these two categories of the tool would not be used in the LRTP development. However, the CMAQ and RSTP processes already in use by HRTPO are well-accepted by its member organizations and are commonly used for "Bicycle and Pedestrian" projects and the "Systems Management/TDM/Operational Improvements" types of projects. The initial research and validation of all categories of projects as a part of this prioritization task will certainly be instructive as the tool evolves and requires revisions.

[16] "Hampton Roads 2030 Long-Range Transportation Plan", December 2007, page 72 describes the definition of "listed" and "non-listed" projects.

5. Evaluation Criteria Weighting Development

With the development of the categories and evaluation criteria complete, the next challenge was to determine the relative importance of each evaluation criterion within each of the six categories. The importance of each evaluation criterion is dependent on the current regional vision and availability of funding. Understanding that these weights are subjective in nature, it is anticipated that they may be modified in the future to address different regional priorities. The important goal in this methodology was to ensure that even though the importance of any given factor is subjective, the final weighting factors were approved by the TTAC and HRTPO Board.

5.1 Evaluation Criteria Weighting Process

From the various literature reviews conducted for this project, the most common weighting process observed was an independent, 100-point cumulative scale within each individual category. In this process, each project starts with zero points and is then awarded points from each evaluation criterion, which together constitutes a maximum of 100 points. Because the scale is out of 100 points, each evaluation criterion's point value is equivalent to its weighting percentage. Therefore, if Evaluation Criterion A is worth 30 points and Evaluation Criterion B is worth 15 points, then Evaluation Criterion A is twice as important as Evaluation Criterion B.

Through discussions with the Steering Committee, TTAC, TAC, and HRTPO Board, it was determined that each project has three distinct traits—utility, viability, and economic vitality. By using just a single 100-point scale inclusive of all three traits, it is possible that the overall significance of each trait could become diluted. Since each trait has a different importance depending on which questions the user is trying to answer, it may sometimes be preferable to select a project with high utility that may not be viable or to select a viable project that does not achieve a high utility. For example, when developing a LRTP with a 20-year timeframe, a project's utility is paramount; however, to maximize the use of current funding opportunities, project viability takes on greater importance. Furthermore, if two projects provide similar utility and are both viable, the deciding factor may be impacts associated with economic vitality.

Therefore, a three-part scoring process was developed which separately considers project utility, project viability, and economic vitality. Each of these traits is evaluated using a 100-point, cumulative scale; however, the totals are independent of each other and are not added together. Letter grades were then assigned to both the project viability and economic vitality scores. This configuration provides policy makers with a parallel analysis by which they can evaluate how viable projects with high utility scores actually are and how they may influence the economic vitality of the region.

The utility score is an *independent*, 100-point cumulative scale, meaning that each project has equal potential to receive the maximum points for each utility evaluation criterion. In this methodology, there are no relative scales (best project gets "X" points, and the next best project gets "X-1" points, etc.). If a project has the ability to earn the maximum amount of points, then it will be allowed to do such. This

approach allows projects to be easily evaluated and scored within a specific category without having to reevaluate previous projects.

In order to determine initial point allocations/weighting factors, both technical and non-technical stakeholders were asked a series of questions using an online survey site, Survey Monkey, to provide input. Two separate versions of the survey were administered: a technical version for Steering Committee and TTAC members and a public version for the general public and elected officials. Both versions required detailed input on the categories and primary criteria while the technical version required additional detailed input on the subcriteria.

Since conducting the survey, however, certain evaluation criteria have been added and removed based on HRTPO Board input along with the ability to obtain valid data and the capability of criteria to differentiate a project's utility within a category. Therefore, the results depicted in this chapter and in **Appendices E1 and E2** reflect preliminary recommendations from the surveys and will not coincide exactly with the final approved evaluation criteria detailed in Chapter 4. As noted frequently within this document, the refinement process will continue throughout the life of this project as regional visions, priorities, and individual characteristics of the projects being evaluated change and evolve. Weighting factor adjustments based on changes in evaluation criteria were established through discussions with HRTPO staff and were approved by both the TTAC and HRTPO Board.

5.2 Technical Weighting Factor Survey Process and Results

The Technical Weighting Factor Survey (TWFS) was structured into 36 questions and was administered online to all members of the Steering Committee and TTAC and additional individuals recommended by the Steering Committee. The first six questions helped to understand the respondent's commuting habits. These questions prompted the respondent for the agency they represent, how long they have lived in Hampton Roads, the transportation modes they use and how often, how long their typical one-way commute was on average (by length and time), and which bridges and/or tunnels are crossed on their typical daily commute. The remaining 30 questions were specific to the weighting factors for each of the six categories. For each category, the first question was asked to determine relative importance of the criteria within the category. For each individual evaluation criterion, the respondent had to provide a rating on a scale from one to five with one being "Very Important," two being "Somewhat Important," three being "Neutral," four being "Somewhat Not Important," and five being "Not at All Important." This question was critical as it would serve as a validation aid for the questions to follow, which were quantitative in nature. Subsequent questions prompted the participant to provide a quantitative response, rating each criterion's importance on a scale between one and 100, with the grand total of all criteria summing to exactly 100.

A summary of technical survey results is presented in **Appendix E1**, while detailed technical survey results are presented in **Appendix E2**.

5.3 Public Weighting Factor Survey and Results

While the initial focus of the project was from a technical approach, the HRTPO Board directed that a public outreach effort, similar to that of the technical effort, be performed. Therefore, the Steering Committee suggested that a public version of the Weighting Factor Survey be developed with less technical dialogue and less detailed input on subcriteria. This version is referred to as the Public Survey. The primary goal was to gather public thoughts and opinions on the relative importance of evaluation criteria and potential weighting factors. The Public Survey also had a secondary goal of increasing awareness about transportation planning processes and HRTPO's roles and responsibilities.

The Public Survey mirrored the Technical Survey and included explanatory information about the process and key definitions of important terminology. Nearly 900 surveys were completed out of approximately 1,300 started. The Steering Committee compared the results of both the Technical and Public versions when determining appropriate weighting factors. **Tables 2 through 7** provide a summary of the results from both surveys.

Due to the numerous comments received during the Public Survey, the HRTPO, in coordination with subject-matter experts at Christopher Newport University and the Hampton Roads Center for Civic Engagement, conducted a series of focus groups during March 2010. The focus groups helped gather feedback regarding transportation priorities from area residents and will complement the future LRTP processes as well as augment HRTPO's efforts to inform, increase awareness, and engage all of Hampton Roads' interested parties.

HIGHWAYS		
Evaluation Criteria	**Response Average (Technical Survey)**	**Response Average (Public Survey)**
Congestion Level	18%	24%
System Continuity and Connectivity	14%	12%
Cost Effectiveness	12%	12%
Land Use Compatability	12%	10%
Safety and Security	12%	11%
Infrastructure (Pavement) Condition	9%	11%
Modal Enhancements	9%	6%
Project Progress	8%	6%
Air Quality / Emissions Reduction	6%	8%

Table 2 - Technical and Public Survey Results for "Highways" Projects

BRIDGE/TUNNEL		
Evaluation Criteria	**Response Average (Technical Survey)**	**Response Average (Public Survey)**
Congestion Level	19%	25%
Infrastructure Condition (Bridge Sufficiency Rating or Tunnel Condition)	18%	11%
System Continuity and Connectivity	12%	11%
Safety and Security	9%	11%
Cost Effectiveness	10%	11%
Land Use Compatability	10%	10%
Modal Enhancements	8%	6%
Project Progress	7%	6%
Air Quality / Emissions Reduction	6%	8%

Table 3 - Technical and Public Survey Results for "Bridge/Tunnel" Projects

BICYCLE AND PEDESTRIAN		
Evaluation Criteria	**Response Average (Technical Survey)**	**Response Average (Public Survey)**
System Continuity and Connectivity	25%	17%
Safety	23%	26%
Cost Effectiveness	17%	21%
Enhances Other Categories	13%	11%
Project Progress	11%	8%
Air Quality / Emissions Reduction	11%	17%

Table 4 - Technical and Public Survey Results for "Bicycle and Pedestrian" Projects

SYSTEMS MANAGEMENT, TDM, OPERATIONAL IMPROVEMENTS		
Evaluation Criteria	**Response Average (Technical Survey)**	**Response Average (Public Survey)**
Congestion Level	19%	28%
Cost Effectiveness	17%	16%
Air Quality / Emissions Reduction	17%	12%
Safety	14%	14%
Regional Significance	15%	13%
Project Progress	9%	8%
Enhances Other Categories	9%	10%

Table 5 - Technical and Public Survey Results for "Systems Management/Transportation Demand Management/Operational Improvements" Projects

TRANSIT		
Evaluation Criteria	**Response Average (Technical Survey)**	**Response Average (Public Survey)**
Existing Usage and/or Prospective Ridership and Coverage Area / Population Served	19%	14%
System Continuity and Connectivity	18%	13%
Land Use Compatability	12%	13%
User Benefit	13%	16%
Cost Effectiveness	14%	16%
Air Quality / Emissions Reduction	9%	11%
Enhances Other Categories	8%	9%
Project Progress	6%	7%

Table 6 - Technical and Public Survey Results for "Transit" Projects

INTERMODAL		
Evaluation Criteria	**Response Average (Technical Survey)**	**Response Average (Public Survey)**
Better Accomodates Intermodal Movements	26%	24%
Improves Rail/Vehicular Access	27%	26%
Cost Effectiveness	22%	22%
Project Progress	12%	12%
Enhances Other Categories	13%	17%

Table 7 - Technical and Public Survey Results for "Intermodal" Projects

As can be seen in the preceding tables, the results from the technical and public surveys are very similar, serving to increase the confidence in the overall results of both surveys.

5.4 Weighting Factor Development and Final Approval

Results were compiled and organized for both the technical and public versions of the survey and served as the basis of discussion during an interactive workshop between VDOT, Kimley-Horn, and the Steering Committee to establish initial, consensus-based weighting factors. Given the changes in categories and criteria since the workshop, the draft weighting factors have been further refined through an iterative process illustrated in **Figure 7** below.

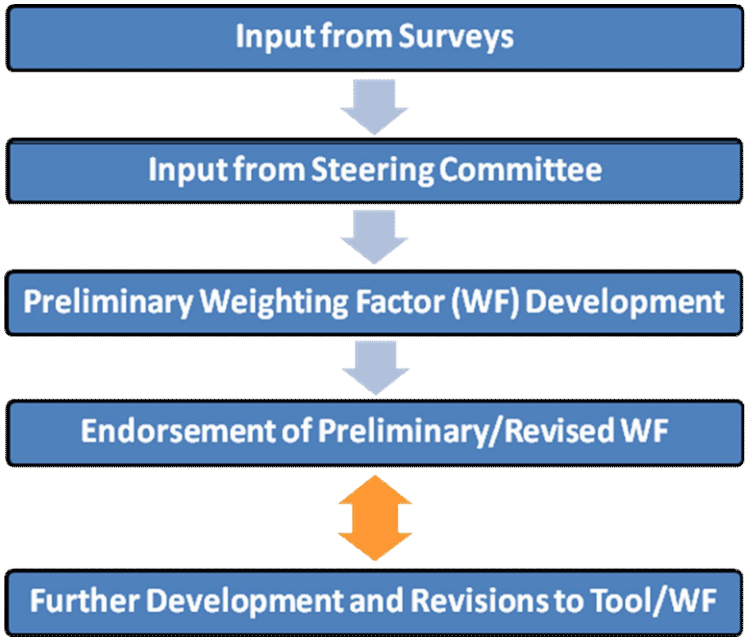
Input from Surveys
Input from Steering Committee
Preliminary Weighting Factor (WF) Development
Endorsement of Preliminary/Revised WF
Further Development and Revisions to Tool/WF

Figure 7 - Iterative Weighting Factor Refinement Process

The final approved evaluation criteria and weighting factors for each project category are summarized in **Figures 8 through 13** below.

"Highways" Weighting Factors	
Criteria and *Subcriteria*	**Weighting**
PROJECT UTILITY	
Congestion Level:	**30.0**
% Reduction in Existing and Future V/C Ratios	*10.0*
Existing V/C Ratio	*10.0*
Impact to Nearby Roadways	*10.0*
System Continuity and Connectivity	**25.0**
Safety and Security:	**10.0**
Critical Crash Ratio	*4.0*
Improvement to Geometric Deficiencies	*3.0*
Improvements to Incident Management or Evacuation Routes	*3.0*
Cost Effectiveness (Cost/VMT)	**15.0**
Land Use/Future Development Compatibility	**10.0**
Modal Enhancements:	**5.0**
Enhances Other Categories	*3.0*
Improves Vehicular Access	*2.0*
Infrastructure (Pavement) Condition	**5.0**
PROJECT UTILITY TOTAL	***100.0***
PROJECT VIABILITY	
Additional Funding	**40.0**
Prior Commitment	**10.0**
Federal Mandates	**10.0**
Project Readiness	**40.0**
PROJECT VIABILITY TOTAL	***100.0***
ECONOMIC VITALITY	
Total Reduction in Travel Time	**30.0**
Labor Market Access:	**20.0**
Increases Travel Time Reliability	*10.0*
Increases Access for Major Employment Centers	*10.0*
Addresses the Needs of Basic Sector Industries:	**30.0**
Increases Access to Tourist Destinations	*10.0*
Increases Access for Defense Installations	*10.0*
Increases Access to Port Facilities	*10.0*
Increases Opportunity:	**20.0**
Provides New or Increased Access	*10.0*
Supports Plans for Future Growth	*10.0*
ECONOMIC VITALITY TOTAL	***100.0***

Note: Orange criteria are utility-based, blue criteria are viability-based, and green criteria are vitality based.

Figure 8 – "Highways" Project Weighting Factors

"Bridge/Tunnel" Weighting Factors	
Criteria and *Subcriteria*	**Weighting**
PROJECT UTILITY	
Congestion Level:	**30.0**
% Reduction in Existing and Future V/C Ratios	*10.0*
Existing V/C Ratio	*10.0*
Impact to Nearby Roadways	*10.0*
Infrastructure Condition (Bridge Sufficiency, Tunnel Condition, Obsolescence)	**20.0**
System Continuity and Connectivity	**10.0**
Safety and Security:	**10.0**
Critical Crash Ratio	*2.5*
Improvement to Geometric Deficiencies	*2.0*
Improvements to Incident Management or Evacuation Routes	*3.0*
Failure Impact (Impact of Detour to Alternate Crossing)	*2.5*
Cost Effectiveness (Cost/VMT)	**15.0**
Land Use/Future Development Compatibility	**10.0**
Modal Enhancements:	**5.0**
Enhances Other Categories	*1.5*
Improves Vehicular Access	*2.0*
Provides Continuous Maritime Crossing	*1.5*
PROJECT UTILITY TOTAL	***100.0***
PROJECT VIABILITY	
Additional Funding	**40.0**
Prior Commitment	**10.0**
Federal Mandates	**10.0**
Project Readiness	**40.0**
PROJECT VIABILITY TOTAL	***100.0***
ECONOMIC VITALITY	
Total Reduction in Travel Time	**30.0**
Labor Market Access:	**20.0**
Increases Travel Time Reliability	*10.0*
Increases Access for Major Employment Centers	*10.0*
Addresses the Needs of Basic Sector Industries:	**30.0**
Increases Access to Tourist Destinations	*10.0*
Increases Access for Defense Installations	*10.0*
Increases Access to Port Facilities	*10.0*
Increases Opportunity:	**20.0**
Provides New or Increased Access	*10.0*
Supports Plans for Future Growth	*10.0*
ECONOMIC VITALITY TOTAL	***100.0***

Note: Orange criteria are utility-based, blue criteria are viability-based, and green criteria are vitality based.

Figure 9 – "Bridge/Tunnel" Project Weighting Factors

"Bicycle and Pedestrian" Weighting Factors	
Criteria and *Subcriteria*	**Weighting**
PROJECT UTILITY	
System Continuity and Connectivity:	**30.0**
Regional Significance	*4.0*
Elimination of barriers to major destinations	*7.0*
Access to transit, local or regional destinations	*11.0*
Connections to Existing Bicycle/Pedestrian Facilities	*8.0*
Safety:	**30.0**
Crash History	*15.0*
Safety Improvement	*15.0*
Cost Effectiveness (Cost/Population Served in 1.5 Mile Radius)	**20.0**
Enhances Other Categories	**10.0**
Land Use/Future Development Compatibility	**10.0**
PROJECT UTILITY TOTAL	***100.0***
PROJECT VIABILITY	
Additional Funding	**40.0**
Prior Commitment	**10.0**
Federal Mandates	**10.0**
Project Readiness	**40.0**
PROJECT VIABILITY TOTAL	***100.0***

Note: Orange criteria are utility-based while blue criteria are viability-based

Figure 10 – "Bicycle and Pedestrian" Project Weighting Factors

"Systems Management, TDM, and Operational Improvement" Weighting Factors	
Criteria and *Subcriteria*	**Weighting**
PROJECT UTILITY	
Congestion Level	**30.0**
Cost Effectiveness (Travel Cost Savings/Total Cost)	**15.0**
Safety	**15.0**
Air Quality/Emissions Reduction	**15.0**
Regional Significance:	**15.0**
Addresses Mobility or Accessibility Needs of Region	*6.0*
Improves Communications Among Various Operating Agencies	*3.0*
Part of the Regional ITS Strategic Plan	*6.0*
Enhances Other Categories	**10.0**
PROJECT UTILITY TOTAL	***100.0***
TDM Projects Only:	**25.0**
Number of Employers Offering TDM Programs	*6.25*
Percent of Employees Ridesharing	*6.25*
Percent of Employees Walking/Biking	*5.0*
Parking Management	*7.5*
PROJECT VIABILITY	
Additional Funding	**40.0**
Prior Commitment	**10.0**
Federal Mandates	**10.0**
Project Readiness	**40.0**
PROJECT VIABILITY TOTAL	***100.0***

Note: Orange and purple criteria are utility-based while blue criteria are viability-based

Figure 11 – "Systems Management/Transportation Demand Management/Operational Improvements" Project Weighting Factors

"Transit" Weighting Factors	
Criteria and *Subcriteria*	**Weighting**
PROJECT UTILITY	
Existing Usage/Ridership, Coverage Area/Population	**20.0**
System Continuity and Connectivity:	**20.0**
Regional Significance	*9.0*
Improves access to employment and population centers	*11.0*
User Benefit (Annual Travel Time Savings per Rider)	**15.0**
Land Use/Future Development Compatibility	**15.0**
Air Quality/Emissions Reduction	**10.0**
Cost Effectiveness (Annualized Costs/Annual Riders)	**15.0**
Enhances Other Categories	**5.0**
PROJECT UTILITY TOTAL	***100.0***
PROJECT VIABILITY	
Additional Funding	**40.0**
Prior Commitment	**10.0**
Federal Mandates	**10.0**
Project Readiness	**40.0**
PROJECT VIABILITY TOTAL	***100.0***
ECONOMIC VITALITY	
Labor Market Access:	**45.0**
Increases Access for Major Employment Centers	*20.0*
Increases Travel Time Reliability	*10.0*
Increases Frequency of Service	*10.0*
Provides Access to Institutions of Higher Education	*5.0*
Addresses the Needs of Basic Sector Industries:	**20.0**
Provides or Improves Access for Defense Installations	*10.0*
Increases Access to Tourist Destinations	*10.0*
Increases Opportunity:	**20.0**
Provides New Access to the Network	*5.0*
Supported by Plans for Increased Density and Economic Activity	*15.0*
Economic Distress Factors:	**15.0**
Provides Access to Areas with High Unemployment	*5.0*
Provides Access to Low Income Areas	*10.0*
ECONOMIC VITALITY TOTAL	***100.0***

Note: Orange criteria are utility-based, blue criteria are viability-based, and green criteria are vitality based.

Figure 12 – "Transit" Project Weighting Factors

"Intermodal" Weighting Factors	
Criteria and *Subcriteria*	**Weighting**
PROJECT UTILITY	
Better Accommodates Intermodal Movements	**30.0**
Improves Vehicular Access	**30.0**
Cost Effectiveness	**25.0**
Enhances Other Categories	**15.0**
PROJECT UTILITY TOTAL	***100.0***
PROJECT VIABILITY	
Additional Funding	**40.0**
Prior Commitment	**10.0**
Federal Mandates	**10.0**
Project Readiness	**40.0**
PROJECT VIABILITY TOTAL	***100.0***
ECONOMIC VITALITY	
Total Reduction in Travel Time	**20.0**
Labor Market Access:	**20.0**
Increases Travel Time Reliability	*15.0*
Increases Access for Major Employment Centers	*5.0*
Impact on Truck Movement	**15.0**
Improves Interaction between Modes of Travel:	**15.0**
Increases Access to the Port	*5.0*
Improves Freight Movement by Rail	*5.0*
Increases Access to Airports	*5.0*
Increased Opportunity:	**30.0**
Provides New or Increased Access	*20.0*
Supports Plans for Future Growth	*10.0*
ECONOMIC VITALITY TOTAL	***100.0***

Note: Orange criteria are utility-based, blue criteria are viability-based, and green criteria are vitality based.

Figure 13 – "Intermodal" Project Weighting Factors

6. Measures of Effectiveness Development

MOEs are a key component of the project scoring process and are the foundation of determining scores for all three utility, viability, and economic vitality components of a project. It has become apparent that the numerous MOE refinements made throughout the development of the Program Prioritization process will continue as the process evolves in the future. When selecting appropriate MOEs for each individual evaluation criterion, the metric should be measureable and able to capture a project's fulfillment of the evaluation criterion (e.g., V/C ratios measure congestion while crash rates measure safety). Additionally, all data required must be readily available, easily manipulated, and validated by the HRTPO before incorporation in the process.

In this Project Prioritization methodology, every evaluation criterion has an MOE which is applied to each project in one of four ways:

- **Obtained MOEs**: These MOEs are obtained from the current LRTP, VDOT, and individual localities. Examples of this MOE type include LOS, average daily traffic (ADT) volumes, and crash rates. Once the data were obtained for a given MOE, thresholds were established to score the project relative to the evaluation criterion. The threshold values represent the expected range within which most, to all, projects would fall. Projects with values outside the threshold range would either receive all or none of the total points (depending on whether the value exceeds or falls short of the range) while projects within the threshold range would receive points based upon a straight-line interpolation (a percentage point system based on where a value falls within the range). The benefits of using these MOEs are their objective nature and ability to assign points on technical merit. The primary disadvantage for this MOE type is that point allocations are completely dependent on the defined threshold range, which can considerably change ultimate point allocations. Therefore, threshold evaluations must be included as part of the prioritization process and should only be revised by consensus at a technical committee meeting.

- **Calculated MOEs**: Calculated MOEs are a subset of the Obtained MOEs. These MOEs are obtained by manipulating different Obtained MOEs within an equation to generate a specific result. For example, the *Cost Effectiveness* criterion for "Highways" is determined by calculating the ratio of project cost per VMT. Similar to Obtained MOEs, these MOEs are highly objective in nature; however, threshold ranges and interpolation are used, requiring the same threshold provisions associated with Obtained MOEs.

- **Multiple Choice MOEs**: These MOEs consist of a list of quantitative or qualitative choices and are the most common MOE type used in this prioritization methodology. These MOEs do not rely on obtained or calculated numbers and can be much more subjective in nature than the two previous MOE types. However, the benefits of using this type of MOE are the ease of data acquisition and application and the ability of the user to classify similar projects within a category without becoming too data-driven (e.g., classifying roadways as either over capacity roadways, at

capacity roadways, or under capacity roadways). This MOE also is effective when there are numerous different project input values with only minor differences (narrow spread). It is then more efficient to limit the number of responses to simplify differentiating between projects. The disadvantage is that for criteria that lack empirical data, one user may interpret the choices differently from another. As with any subjective criteria, the chosen MOEs rely on user interpretation of the available choices.

- **Either/Or MOEs**: MOEs of this type include basic yes/no ("it either is or it isn't") inputs. As the simplest type, these MOEs are intended to be highly objective with empirical measures (e.g., is the project included in the current LRTP).

The following sections briefly describe the MOEs used for each evaluation criterion within each project category. For a detailed description of the MOEs, thresholds, and point allocations, please refer to **Appendix F**.

6.1 Measures of Effectiveness for Project Utility

A project's utility considers the project's ability to solve an existing transportation issue, which could be correlated to congestion, safety, infrastructure condition, or ridership. Each of the six project categories has independent evaluation criteria to assess project utility based on the perceived technical merits that that particular type of project should achieve. The evaluation criteria and accompanying MOEs for each project category are described below.

6.1.1 Project Utility Measures of Effectiveness – "Highways"

To assess a project's utility for the "Highways" category, a total of seven evaluation criteria were selected with a distinct set of MOEs for each. The seven criteria used to evaluate the utility of highway projects are as follows:

Congestion Level: Under this criterion, a project is evaluated based on both the degree of existing congestion within the project area and the project's potential to improve congestion levels after construction. In order to assess existing and future levels of congestion, three subcriteria were developed for this criterion:

- *Percent reduction of existing V/C ratios:* This subcriterion uses a Calculated MOE based upon the overall reduction between existing and projected future V/C ratios for the project area. The points awarded for this subcriterion are calculated automatically from the user-input existing V/C ratio and forecasted V/C ratio. The calculation finds the difference between the existing and future V/C ratios and then divides this difference by the existing V/C ratio to calculate the percent change. Points are then awarded according to the designated threshold range with straight-line interpolation for values falling within the range.

- *Existing V/C ratio:* This subcriterion uses an Obtained MOE to evaluate the existing level of congestion within the project area. Points are awarded in a manner similar to a Multiple Choice MOE where if the existing V/C ratio falls within one of three identified ranges, points are awarded accordingly. This was done because small differences in V/C ratios generally do not indicate significantly different levels of congestion for a roadway (e.g., a roadway with a V/C ratio of 0.90 will seem as congested as a roadway with a V/C ratio of 0.95).

- *Impact to nearby roadways:* This subcriterion uses a Calculated MOE based on the volume of traffic that will be attracted to the project roadway from adjacent roadways as a result of construction. The points awarded for this subcriterion are calculated automatically by taking the difference between the user-input future ADT and existing ADT for the project area. Although it is understood that the difference between future and existing ADTs may include latent demand, it was assumed that this difference would be the best representation of relief on adjacent facilities. Points are then awarded according to the designated threshold range with straight-line interpolation for values falling within the range.

***System Continuity and Connectivity*:** This evaluation criterion uses a Multiple Choice MOE to evaluate the extent to which a project will impact the overall continuity and connectivity of the region's transportation network. The user has a multiple choice selection of the level at which a project will impact continuity and connectivity: Regional, Multijurisdictional, or Local. For a project to be classified as Regional, it would have to be regionally significant with regards to connectivity and continuity and provide considerable benefit to the regional transportation system. Projects not classified as Regional may be classified as Multijurisdictional if they impact continuity and connectivity or provide benefit to at least two local jurisdictions. Projects having only local significance and providing benefit to only one local jurisdiction are classified as Local. Points are awarded accordingly for each classification. It is important to note that this criterion is not a measure of the physical project boundaries spanning separate jurisdictions (e.g., a roadway project traversing an entire city and extending into another city) but rather a measure of the project's impact to the overall roadway system connectivity for multiple jurisdictions. It also is important to note that because this criterion is not based on a tangible, statistical MOE, it can be very subjective. Therefore, decisions about how to classify a project under this criterion should be made objectively by HRTPO staff or an objective prioritization committee.

***Cost Effectiveness*:** This evaluation criterion uses a Calculated MOE to evaluate the ratio of the overall cost of the project with respect to the number of users the project will serve. The points awarded for this criterion are calculated automatically by taking the ratio of the estimated project cost divided by the 2030 VMT (both of which are user-input values). Points are then awarded according to the designated threshold range with straight-line interpolation for values falling within the range.

***Compatibility with Existing Land Use Patterns and Future Plans and Development*:** This evaluation criterion uses a Multiple Choice MOE to assess a project's compatibility with both existing and future land uses. The user must select between three classifications for a project with points awarded accordingly:

Compatible and Officially Documented, Compatible but Not Officially Documented, and Not Compatible. For a project to be classified as Compatible and Officially Documented and receive full points, it must be compatible with both existing land use patterns and future plans (as determined by the user) and must be formally adopted by a body of elected officials, such as in the form of a comprehensive plan. A project is classified as Compatible but Not Officially Documented and receives partial points if it is compatible with existing and future land use patterns (as determined by the user) but has not been formally adopted by a body of elected officials. If a project is not compatible with existing and future land use patterns (as determined by the user), it is classified as Not Compatible and receives no points.

***Safety and Security*:** Under this criterion, a project is evaluated based on its impact to evacuation/incident management routes and its potential to improve safety. In order to assess safety and security impacts, three subcriteria were developed for this criterion:

- *Critical Crash Ratio:* This subcriterion uses a Calculated MOE based upon the CCR for the project area. The CCR is calculated by taking the ratio of the actual crash rate for the project area to the average jurisdictional crash rate for where the project resides. The actual crash rate for the project area is a calculated value based on the user input of project length, existing ADT, and total crashes in the past three years. Using these values, the actual crash rate is calculated in number of crashes per million VMT. The average jurisdictional crash rate is a user-input value and is obtained from the Department of Motor Vehicles. Points awarded for this subcriterion are calculated automatically based on the CCR according to the designated threshold range with straight-line interpolation for values falling within the range.

- *Improvement of Geometric Deficiencies:* This subcriterion uses a Multiple Choice MOE to determine the extent to which a project will improve existing geometric deficiencies. Geometric deficiencies are generally defined as physical roadway features that do not meet current design standards. Common geometric deficiencies include horizontal and vertical curvature, sight distance limitations, lane/shoulder widths, clear zone requirements, and multimodal conflicts. The user has a multiple choice selection of the number of geometric deficiencies a project will eliminate.

- *Improvement to Incident Management or Evacuation Routes:* This subcriterion uses an Either/Or MOE to classify whether a project will improve incident management or evacuation routes within the region. A “Yes” is entered for this subcriterion only if a project will improve an established and documented incident management or evacuation route and then full points are awarded; otherwise, a “No” is entered and no points are awarded.

***Infrastructure Condition*:** This evaluation criterion uses an Obtained MOE called the CCI to evaluate the existing pavement conditions within the project area; however, points are awarded in a Multiple Choice MOE fashion. The CCI is a numerical value assigned to a roadway to describe its physical condition. Points are assigned to projects based on five pre-established ranges.

***Modal Enhancements*:** Under this criterion, a project is evaluated based on its impact to other modes of transportation aside from personal vehicles. In order to assess modal enhancements, two subcriteria were developed for this criterion:

- *Improving vehicular access to freight distribution facilities, ports, major industrial clients, or employment and population centers:* This subcriterion uses a Multiple Choice MOE to determine the extent to which a project will improve existing access to freight distribution facilities, ports, etc. The user must choose between three classifications: Yes and Regional, Yes but Not Regional, or No. For a project to be classified as Yes and Regional and receive full points, it must improve vehicular access to one of the following: seaport, airport, military facility, connections between jurisdictions, or connections between major industrial/employment centers. If a project will improve vehicular access but will not include one of the regional facilities mentioned above, then it is classified as Yes but Not Regional and receives partial points. If the project does not improve access to any of these types of facilities, it should be classified as No and receives no points.

- *Enhances Other Categories:* This subcriterion uses a Multiple Choice MOE to classify the degree to which a project will enhance other project categories. Enhancement to other categories could include the installation of bus shelters ("Transit" enhancement), installation of sidewalks or bike paths ("Bicycle and Pedestrian" enhancement), improvement to a water crossing ("Bridge/Tunnel" enhancement), the implementation of a TDM initiative or ITS improvement ("Systems Management/TDM/Operational Improvements" enhancement), or an improvement to intermodal movements ("Intermodal" enhancement). The user has a multiple choice selection of how many enhancements are included (None, One, Two, or Three or More), and points are allocated accordingly.

6.1.2 Project Utility Measures of Effectiveness – "Bridge/Tunnel"

To assess a project's utility for the "Bridge/Tunnel" category, a total of seven evaluation criteria were selected with a distinct set of MOEs for each. The seven criteria used to evaluate bridge/tunnel projects are as follows:

Congestion Level: Under this criterion a project is evaluated based on both the degree of existing congestion within the project area and the project's potential to improve congestion levels after construction. To assess existing levels of congestion and future improvement, three subcriteria were developed for this criterion:

- *Percent reduction of existing V/C ratios:* This subcriterion uses a Calculated MOE based upon the overall reduction between existing and projected future V/C ratios. The points awarded for this subcriterion are calculated automatically from the user-input existing V/C ratio and forecasted V/C ratio. The calculation finds the difference between the existing and future V/C ratios and then divides this difference by the existing V/C ratio to calculate the percent change. Points are then

awarded according to the designated threshold range with straight-line interpolation for values falling within the range.

- *Existing V/C ratio:* This subcriterion uses an Obtained MOE to evaluate the existing level of congestion within the project area. Points are awarded in a manner similar to a Multiple Choice MOE where if the existing V/C ratio falls within one of three identified ranges, points are awarded accordingly. This was done because small differences in V/C ratios generally do not indicate significantly different levels of congestion for a roadway (e.g., a roadway with a V/C ratio of 0.90 will seem as congested as a roadway with a V/C ratio of 0.95).

- *Impact to nearby roadways:* This subcriterion uses a Calculated MOE based on the volume of traffic that will be attracted to the project roadway from adjacent roadways as a result of construction. The points awarded for this subcriterion are calculated automatically by taking the difference between the user-input future ADT and existing ADT for the project area. Although it is understood that the difference between future and existing ADTs may include latent demand, it was assumed that this difference would be the best representation of relief on adjacent facilities. Points are then awarded according to the designated threshold range with straight-line interpolation for values falling within the range.

Infrastructure Condition: Under this criterion, a project is evaluated based on the existing condition of the bridge or tunnel infrastructure. To assess infrastructure conditions, two subcriteria were developed for this criterion (one for bridges and one for tunnels):

- *Bridge Sufficiency Rating (**bridges only**):* This subcriterion uses an Obtained MOE called the Bridge Sufficiency Rating (BSR) to evaluate the existing structural condition of the bridge; however, points are awarded in a Multiple Choice MOE manner. The BSR is a nationwide program that assesses bridges based on a 0 to 100 scale with ratings of less than 50 indicating structures in poor condition. The BSR allocates points using three ranges, with similarly ranged projects being awarded the same number of points.

- *Tunnel Condition (**tunnels only**):* This subcriterion is essentially a series of three Either/Or MOEs to assess the existing structural condition of a tunnel facility. Points are awarded cumulatively for answering "Yes" to each of the three following questions:

    - Is the tunnel more than 40 years old?
    - Was the last major repair more than 20 years ago?
    - Is the estimated cost of necessary repairs greater than $10 million, or has the facility never had a major repair?

***System Continuity and Connectivity*:** This evaluation criterion uses a Multiple Choice MOE to evaluate the extent to which a project will impact the overall continuity and connectivity of the region's transportation

network. The user has a multiple choice selection of the level at which a project will impact continuity and connectivity: Regional, Multijurisdictional, or Local. For a project to be classified as Regional, it would have to be regionally significant with regards to connectivity and continuity and provide considerable benefit to the regional transportation system. A project not classified as Regional may be classified as Multijurisdictional if it impacts continuity and connectivity for or provides benefit to at least two local jurisdictions. A project having only local significance and providing benefit to only one local jurisdiction is classified as Local. Points are awarded accordingly for each classification. It is important to note that this criterion is not a measure of the physical project boundaries spanning separate jurisdictions (e.g., a bridge project extending between two cities) but rather a measure of the project's impact to the overall system connectivity for multiple jurisdictions. It also is important to note that because this criterion is not based on a tangible, statistical MOE, it can be very subjective. Therefore, decisions about how to classify a project under this criterion should be made objectively by HRTPO staff or an objective prioritization committee.

***Safety and Security*:** Under this criterion, a project is evaluated based on its impact to evacuation/incident management routes and its potential to improve safety. In order to assess safety and security impacts, four subcriteria were developed for this criterion:

- *CCR:* This subcriterion uses a Calculated MOE based upon the CCR for the project area. The CCR is calculated by taking the ratio of the actual crash rate for the project area to the average jurisdictional crash rate for where the project resides. The actual crash rate for the project area is a calculated value based on the user inputs of project length, existing ADT, and total crashes in the past three years. Using these values, the actual crash rate is calculated in number of crashes per million VMT. The average jurisdictional crash rate is a user-input value and is obtained from the Department of Motor Vehicles. Points awarded for this subcriterion are calculated automatically based on the CCR according to the designated threshold range with straight-line interpolation for values falling within the range.

- *Improvement of Geometric Deficiencies:* This subcriterion uses a Multiple Choice MOE to determine the extent to which a project will improve existing geometric deficiencies. Geometric deficiencies are generally defined as physical roadway features that do not meet current design standards. Common geometric deficiencies include horizontal and vertical curvature, sight distance limitations, lane/shoulder widths, clear zone requirements, and multimodal conflicts. The user has a multiple choice selection of the number of geometric deficiencies a project will eliminate.

- *Improvement to Incident Management or Evacuation Routes:* This subcriterion uses an Either/Or MOE to classify whether a project will improve incident management or evacuation routes within the region. A "Yes" is entered for this subcriterion only if a project will improve an established and documented incident management or evacuation route and then full points are awarded; otherwise, a "No" is entered and no points are awarded.

- *Diversion Impact Due to Failure:* This subcriterion uses an Obtained MOE to measure the impact on the region if a bridge or tunnel fails or is temporarily impassable. Although this is a distinct numerical value, points are awarded in a manner similar to a Multiple Choice MOE. This subcriterion divides the range of possible values into three segments and awards the same number of points for all values falling within the same segment. Diversion impact is measured by the daily VMT along the required route to detour around the failed facility. This VMT is the sum of the affected ADT multiplied by the length of the required detour in miles (which must be input manually by the user) and the current daily VMT along the detour route. The intent of using VMT was to capture lengthy detours with lower traffic demand in addition to relativity short detours with high traffic demand. Based on the magnitude of the detoured VMT, the impact is categorized as Regional, Multijurisdictional, or Local.

***Cost Effectiveness*:** This evaluation criterion uses a Calculated MOE to evaluate the ratio of the overall cost of the project with respect to the number of users the project will serve. The points awarded for this criterion are calculated automatically by taking the ratio of the estimated project cost divided by the 2030 VMT (both of which are user-input values). Points are then awarded according to the designated threshold range with straight-line interpolation for values falling within the range.

***Compatibility with Existing Land Use Patterns and Future Plans and Development*:** This evaluation criterion uses a Multiple Choice MOE to assess a project's compatibility with both existing and future land uses. The user must select between three classifications for a project with points awarded accordingly: Compatible and Officially Documented, Compatible but Not Officially Documented, and Not Compatible. For a project to be classified as Compatible and Officially Documented and receive full points, it must be compatible with both existing land use patterns and future plans (as determined by the user) and must be formally adopted by a body of elected officials, such as in the form of a comprehensive plan. A project is classified as Compatible but Not Officially Documented and receives partial points if it is compatible with existing and future land use patterns (as determined by the user) but has not been formally adopted by a body of elected officials. If a project is not compatible with existing and future land use patterns (as determined by the user), it is classified as Not Compatible and receives no points.

***Modal Enhancements*:** Under this criterion, a project is evaluated based on its impact to other modes of transportation aside from personal vehicles. In order to assess modal enhancements, three subcriteria were developed for this criterion:

- *Improving vehicular access to freight distribution facilities, ports, major industrial clients, or employment and population centers:* This subcriterion uses a Multiple Choice MOE to determine the extent to which a project will improve existing access to freight distribution facilities, ports, etc. The user must choose between three classifications: Yes and Regional, Yes but Not Regional, or No. For a project to be classified as Yes and Regional and receive full points, it must improve vehicular access to one of the following: seaport, airport, military facility, connections between jurisdictions, or connections between major industrial/employment centers. If a project will

improve vehicular access but will not include one of the regional facilities mentioned above, then it is classified as Yes but Not Regional and receives partial points. If the project does not improve access to any of these types of facilities, it should be classified as No and receives no points.

- *Enhances Other Categories:* This subcriterion uses a Multiple Choice MOE to classify the degree to which a project will enhance other project categories. Enhancement to other categories could include the installation of bus shelters ("Transit" enhancement), installation of sidewalks or bike paths ("Bicycle and Pedestrian" enhancement), inclusion of HOV service ("Highways" enhancement), the implementation of a TDM initiative or ITS improvement ("Systems Management/TDM/Operational Improvements" enhancement), or an improvement to intermodal movements ("Intermodal" enhancement). The user has a multiple choice selection of how many enhancements are included (None, One, Two, or Three or More), and points are allocated accordingly.

- *Continuous maritime crossing:* This subcriterion uses an Either/Or MOE to classify whether a project will provide uninterrupted maritime crossing. A "Yes" is entered for this subcriterion only if the project will provide new uninterrupted maritime crossings (e.g., an elevated fixed-span bridge) and then full points are awarded; otherwise, a "No" is entered and no points are awarded. If a facility already provides this attribute, full points are awarded.

6.1.3 Project Utility Measures of Effectiveness – "Bicycle and Pedestrian"

To assess a project's utility for the "Bicycle and Pedestrian" category, a total of five evaluation criteria were selected with a distinct set of MOEs for each. The five criteria used to evaluate bicycle and pedestrian projects are as follows:

***System Continuity and Connectivity*:** Under this criterion, a project is evaluated based on its impact to the connectivity and continuity of the greater Hampton Roads network of bicycle and pedestrian facilities. To assess system continuity and connectivity, four subcriteria were developed for this criterion:

- *Regional Significance:* This subcriterion uses a Multiple Choice MOE to evaluate the extent to which a project will impact bicycle and/or pedestrian facilities in the region. The user has a multiple choice selection of the level at which a project will impact continuity and connectivity: Regional, Multijurisdictional, or Local. For a project to be classified as Regional, it would have to be regionally significant with regards to connectivity and continuity and provide considerable benefit to the regional bicycle/pedestrian system. A project not classified as Regional may be classified as Multijurisdictional if it impacts continuity and connectivity for or provides benefit to at least two local jurisdictions. A project having only local significance and providing benefit to only one local jurisdiction is classified as Local. Points are awarded accordingly for each classification. It is important to note that this criterion is not a measure of the physical project boundaries spanning separate jurisdictions (e.g., a bike path project traversing an entire city and extending into another city) but rather a measure of the project's impact to the overall bicycle/pedestrian system

connectivity for multiple jurisdictions. It also is important to note that because this criterion is not based on a tangible, statistical MOE, it can be very subjective. Therefore, decisions about how to classify a project under this criterion should be made objectively by HRTPO staff.

- *Elimination of barriers or completion of gaps across major barriers:* This subcriterion uses an Either/Or MOE to classify whether a project will eliminate barriers or will complete gaps across major barriers in the bicycle/pedestrian network. For example, will the project provide a crossing of a major arterial or water crossing, or will it move bicycle and pedestrian paths away from the roadway? The project description must describe the barrier being eliminated such that the evaluation committee may assess if the proposed facility is actually a major barrier. A "Yes" is entered for this subcriterion only if a project will eliminate at least one barrier or complete at least one gap and then full points are awarded; otherwise, a "No" is entered and no points are awarded.

- *Connection of existing bicycle and pedestrian facilities:* This subcriterion uses an Either/Or MOE to classify whether a project will connect existing bicycle and pedestrian facilities. A "Yes" is entered for this subcriterion only if a project will connect at least two existing bicycle and pedestrian facilities and then full points are awarded; otherwise, a "No" is entered and no points are awarded.

- *Project provides access to transit, local, or regional destinations:* This subcriterion uses a Multiple Choice MOE to classify the degree to which a project will enhance access to transit, local, or regional destinations. Examples of local or regional destinations include schools, employment centers, parks, or high density residential areas. The user has a multiple choice selection of how many destinations will have enhanced access (None, One, Two, or Three or More), and points are allocated accordingly.

***Safety*:** Under this criterion, a project is evaluated based on its potential to improve safety. In order to assess safety impacts, two subcriteria were developed for this criterion:

- *Crash history:* This subcriterion uses an Obtained MOE (average number of crashes per year during a predetermined three-year period) to measure the pedestrian and bicycle crash history within the project area. Crash data are obtained from the Department of Motor Vehicles (DMV) and are input by the user. Although the number of crashes is a distinct numerical value, points are awarded in a manner similar to a Multiple Choice MOE. This subcriterion allocates points amongst three distinct ranges. For all projects falling within the same segment, equal points are awarded.

- *Project is being completed to address an existing safety issue or concern:* This subcriterion uses an Either/Or MOE to classify whether a project will address an existing safety issue or concern. Safety remedies could include the installation of a dedicated bike lane or shifting bicycle traffic to a multiuse path located behind a curb line. Signage plans also would be considered a safety improvement. If a project will address at least one existing safety issue or concern, then a "Yes"

should be entered and full points are awarded; otherwise, a "No" is entered and no points awarded.

***Cost Effectiveness*:** This evaluation criterion uses a Calculated MOE to evaluate the ratio of the overall cost of the project with respect to the number of users the project will serve. The points awarded for this criterion are calculated automatically by taking the ratio of the estimated project cost divided by the population within a 1.5-mile radius of project (both of which are user-input values). Points are then awarded according to the designated threshold range with straight-line interpolation for values falling within the range.

***Enhances Other Categories*:** This evaluation criterion uses a Multiple Choice MOE to classify the degree to which a project will enhance other project categories. Enhancement to other categories could include the installation of bus shelters ("Transit" enhancement), inclusion of HOV service ("Highways" enhancement), improvement to a water crossing ("Bridge/Tunnel" enhancement), the implementation of a TDM initiative or ITS improvement ("Systems Management/TDM/Operational Improvements" enhancement), or an improvement to intermodal movements ("Intermodal" enhancement). While there are a total of six overall project categories, "Bridge/Tunnel" and "Highways" are considered one enhancement for this criterion, given their similarities. Therefore, a project which enhances both "Highways" and "Bridge/Tunnel" can only receive credit for one enhancement. The user has a multiple choice selection of how many enhancements are included (None, One, Two, or Three or More), and points are allocated accordingly.

***Compatibility with Existing Land Use Patterns and Future Plans and Development*:** This evaluation criterion uses a Multiple Choice MOE to assess a project's compatibility with both existing and future land uses. The user must select between three classifications for a project with points awarded accordingly: Compatible and Officially Documented, Compatible but Not Officially Documented, and Not Compatible. For a project to be classified as Compatible and Officially Documented and receive full points, it must be compatible with both existing land use patterns and future plans (as determined by the user) and must be formally adopted by a body of elected officials, such as in the form of a comprehensive plan. A project is classified as Compatible but Not Officially Documented and receives partial points if it is compatible with existing and future land use patterns (as determined by the user) but has not been formally adopted by a body of elected officials. If a project is not compatible with existing and future land use patterns (as determined by the user), it is classified as Not Compatible and receives no points.

6.1.4 Project Utility Measures of Effectiveness – "Systems Management/TDM/ Operational Improvements"

To assess a project's utility for the "Systems Management/TDM/Operational Improvements" category, a total of six evaluation criteria were selected with a distinct set of MOEs for each. The six criteria used to evaluate "Systems Management/TDM/Operational Improvements" projects are as follows:

***Existing Congestion Level*:** This evaluation criterion uses a Multiple Choice MOE to classify the level of congestion within the project's impact area. The user must select between three classifications for a project with points awarded accordingly: Severe, Moderate, and Low. These classifications are obtained from the LRTP for all roadway sections within Hampton Roads. While this is a subjective metric, it is anticipated that the projects with a broader area of influence would generally be classified as Severe with more localized projects generally being classified as Low.

***Cost Effectiveness*:** This evaluation criterion uses a Calculated MOE to evaluate the ratio of the total travel cost savings to the total cost of the project. The total travel cost savings are obtained from CMAQ sources by HRTPO staff. Points are then awarded according to the designated threshold range with straight-line interpolation for values falling within the range.

***Air Quality*:** This evaluation criterion uses an Obtained MOE to evaluate the total reduction (in tons) of VOC and NOx emissions annually if the project were constructed. These values are obtained from CMAQ sources by HRTPO staff with assistance from the submitting organization. Points are then awarded according to the designated threshold range with straight-line interpolation for values falling within the range.

***Safety*:** This evaluation criterion is essentially a series of three Either/Or MOEs to assess how a project will improve safety. Points are awarded cumulatively for answering "Yes" to each of the three following questions:

- Does the project improve an established and documented evacuation or incident management route?
- Does the project include the implementation of emergency vehicle preemption or incident detection systems?
- Is the project expected to reduce the number of crashes annually based on crash data obtained from the past three years? (*If the project is addressing a known cause of crashes, then it is expected that the project would decrease the number of crashes throughout the study area.)*

***Regional Significance*:** Under this criterion, a project is evaluated based on the degree to which it will improve mobility, access, or communications within the region. To assess *Regional Significance*, three subcriteria were developed for this criterion:

- *Mobility or accessibility needs:* This subcriterion uses a Multiple Choice MOE to evaluate the extent to which a project will impact mobility or accessibility needs within the region. The user has a multiple choice selection of three levels: Regional, Multijurisdictional, or Local. For a project to be classified as Regional, it would have to be regionally significant with regards to mobility and accessibility and provide considerable progress in meeting regional needs. A project not classified as Regional may be classified as Multijurisdictional if it improves mobility and accessibility for or

provides benefit to at least two local jurisdictions. A project having only local significance and providing benefit to only one local jurisdiction is classified as Local. Points are awarded accordingly for each classification. It is important to note that this criterion is not a measure of the physical project boundaries spanning separate jurisdictions (e.g., a project impacting an entire city and extending into another city) but rather a measure of the project's impact to overall mobility and accessibility needs for multiple jurisdictions. It also is important to note that because this criterion is not based on a tangible, statistical MOE, it can be very subjective. Therefore, decisions about how to classify a project under this criterion should be made objectively by HRTPO staff or an objective prioritization committee.

- *Improves communications between operating agencies:* This subcriterion uses an Either/Or MOE to classify whether a project will improve communications between operating agencies (e.g., police, fire, VDOT 511, City Traffic Operation Centers, etc.). A "Yes" is entered for this subcriterion only if a project will improve communications between at least two agencies and then full points are awarded; otherwise, a "No" is entered and no points are awarded.

- *Project is part of the Regional ITS Strategic Plan:* This subcriterion uses an Either/Or MOE to classify whether a project is part of the Regional ITS Strategic Plan. A "Yes" is entered for this subcriterion only if a project is officially documented within the plan and then full points are awarded; otherwise a "No" is entered and no points are awarded.

***Enhances Other Categories*:** This evaluation criterion uses a Multiple Choice MOE to classify the degree to which a project will enhance other project categories. Enhancement to other categories could include the installation of bus shelters ("Transit" enhancement), installation of sidewalks or bike paths ("Bicycle and Pedestrian" enhancement), inclusion of HOV service ("Highways" enhancement), improvement to a water crossing ("Bridge/Tunnel" enhancement), or an improvement to intermodal movements ("Intermodal" enhancement). While there are a total of six overall project categories, "Bridge/Tunnel" and "Highways" are considered one enhancement for this criterion, given their similarities. Therefore, a project which enhances both "Highways" and "Bridge/Tunnel" can only receive credit for one enhancement. The user has a multiple choice selection of how many enhancements are included (None, One, Two, or Three or More), and points are allocated accordingly.

***TDM Specific Criterion (TDM projects only)*:** Under this criterion, a TDM project is evaluated based on the degree to which it will encourage alternate modes of transportation or offer new TDM programs. In order to assess TDM projects, four subcriteria were developed for this criterion:

- *Number of new employers offering TDM programs:* This subcriterion uses an Obtained MOE based upon the number of new employers offering TDM programs to their employees after the completion of a project. Points are then awarded according to the designated threshold range with straight-line interpolation for values falling within the range.

- *Resulting percentage of employees ridesharing:* This subcriterion uses an Obtained MOE to evaluate the percentage of employees ridesharing if a project were implemented. Although the percentage is a discrete numerical value, points are awarded in a manner similar to a Multiple Choice MOE. Instead of using a threshold range and straight line interpolation for percentage values falling within the threshold range, this subcriterion divides the range of possible percentages into three segments and awards the same number of points for all percentages falling within the same segment.

- *Resulting percentage of employees walking/biking:* This subcriterion uses an Obtained MOE to evaluate the percentage of employees that will walk or bike to work if a project were implemented. Although the percentage is a discrete numerical value, points are awarded in a manner similar to a Multiple Choice MOE. Instead of using a threshold range and straight line interpolation for percentage values falling within the threshold range, this subcriterion divides the range of possible percentages into three segments and awards the same number of points for all percentages falling within the same segment.

- *Parking Management:* This subcriterion uses an Either/Or MOE to classify whether a project includes parking management strategies. A "Yes" is entered for this criterion only if a project includes parking management strategies such as long- vs. short-term parking, special carpool/hybrid parking, or implementation of parking fees, and then full points are awarded. Otherwise, a "No" is entered and no points are awarded.

6.1.5 Project Utility Measures of Effectiveness – "Transit"

To assess a project's utility for the "Transit" category, a total of seven evaluation criteria were selected with a distinct set of MOEs for each. The seven criteria used to evaluate transit projects are as follows:

***Existing Usage or Prospective Ridership*:** This evaluation criterion uses an Obtained MOE based upon the existing average daily ridership for an improvement project or the forecasted daily ridership for a new project. Points are awarded according to the designated threshold range with straight-line interpolation for values falling within the range.

***System Continuity and Connectivity*:** Under this criterion, a project is evaluated based on the degree to which it will improve continuity and connectivity of transit systems within the region. In order to assess system continuity and connectivity for transit systems, two subcriteria were developed for this criterion:

- *Regional significance:* This subcriterion uses a Multiple Choice MOE to evaluate the extent to which a project will impact the overall continuity and connectivity of the region's transit network. The user has a multiple choice selection of the level of significance of a project: Regional, Multijurisdictional, or Local. For a project to be classified as Regional, it would have to be regionally significant with regards to connectivity and continuity and provide considerable benefit to the regional transit system. A project not classified as Regional may be classified as

Multijurisdictional if it impacts continuity and connectivity for or provides benefit to at least two local jurisdictions. A project having only local significance and providing benefit to only one local jurisdiction is classified as Local. Points are awarded accordingly for each classification. It is important to note that this criterion is not a measure of the physical project boundaries spanning separate jurisdictions (e.g., a project traversing an entire city and extending into another city) but rather a measure of the project's impact to the overall transit system connectivity for multiple jurisdictions. It also is important to note that because this criterion is not based on a tangible, statistical MOE, it can be very subjective. Therefore, decisions about how to classify a project under this criterion should be made objectively by HRTPO staff or an objective prioritization committee.

- *Improving transit access to freight distribution facilities, ports, major industrial clients, or employment and population centers:* This subcriterion uses a Multiple Choice MOE to determine the extent to which a project will improve existing access to freight distribution facilities, ports, etc. The user must choose between three classifications: Yes and Regional, Yes but Not Regional, or No. For a project to be classified as Yes and Regional and receive full points, it must improve transit access to one of the following: seaport, airport, military facility, connections between jurisdictions, or connections between major industrial/employment centers. If a project will improve transit access but will not include one of the regional facilities mentioned above, then it is classified as Yes but Not Regional and receives partial points. If the project does not improve access to any of these types of facilities, it should be classified as No and receives no points.

***User Benefit*:** Under this criterion, a project is evaluated based on the degree to which it will reduce travel times for users and whether the project results in a new amenity. In order to assess system user benefit, two subcriteria were developed:

- *Annual travel time savings per rider:* This subcriterion uses a Calculated MOE based upon the annual travel time savings per rider after completion of a project. The points awarded for this subcriterion are calculated automatically from the user input of annual travel time savings in hours (obtained from the agency submitting the project) and estimated annual ridership. Points are then awarded according to the designated threshold range with straight-line interpolation for values falling within the range.

- *New Project:* This subcriterion uses an Either/Or MOE to classify whether a project will result in new transit amenities (e.g., service, route, etc.). A "Yes" is entered for this criterion only if a project results in the creation of new transit amenities and then full points are awarded; if a project is simply an upgrade of an existing system, then a "No" is entered and no points are awarded.

***Compatibility with Existing Land Use Patterns and Future Plans and Development*:** This evaluation criterion uses a Multiple Choice MOE to assess a project's compatibility with both existing and future land

uses. The user must select between three classifications for a project with points awarded accordingly: Compatible and Officially Documented, Compatible but Not Officially Documented, and Not Compatible. For a project to be classified as Compatible and Officially Documented and receive full points, it must be compatible with both existing land use patterns and future plans (as determined by the user) and must be formally adopted by a body of elected officials, such as in the form of a comprehensive plan. A project is classified as Compatible but Not Officially Documented and receives partial points if it is compatible with existing and future land use patterns (as determined by the user) but has not been formally adopted by a body of elected officials. If a project is not compatible with existing and future land use patterns (as determined by the user), it is classified as Not Compatible and receives no points.

***Cost Effectiveness*:** This evaluation criterion uses a Calculated MOE to evaluate the ratio of the annual capital and operating costs of the project with respect to the number of users the project will serve. The points awarded for this criterion are calculated automatically by taking the ratio of the sum of the estimated total capital cost of the project (annualized) and the estimated total operating cost of the project (annualized) divided by the estimated annual ridership (all of which are user-input values). Points are then awarded according to the designated threshold range with straight-line interpolation for values falling within the range.

***Air Quality*:** This evaluation criterion uses an Obtained MOE to evaluate the total reduction (in tons) of VOC and NOx emissions annually if the project were constructed. These values are obtained from CMAQ sources by HRTPO staff with assistance from the submitting organization. Points are then awarded according to the designated threshold range with straight-line interpolation for values falling within the range.

***Enhances Other Categories*:** This evaluation criterion uses a Multiple Choice MOE to classify the degree to which a project will enhance other project categories. Enhancement to other categories could include installation of sidewalks or bike paths ("Bicycle and Pedestrian" enhancement), inclusion of HOV service ("Highways" enhancement), improvement to a water crossing ("Bridge/Tunnel" enhancement), the implementation of a TDM initiative or ITS improvement ("Systems Management/TDM/Operational Improvements" enhancement), or an improvement to intermodal movements ("Intermodal" enhancement). While there are a total of six overall project categories, "Bridge/Tunnel" and "Highways" are considered one enhancement for this criterion, given their similarities. Therefore, a project which enhances both "Highways" and Bridge/Tunnel" can only receive credit for one enhancement. The user has a multiple choice selection of how many enhancements are included (None, One, Two, or Three or More), and points are allocated accordingly.

6.1.6 Project Utility Measures of Effectiveness – "Intermodal"

To assess a project's utility for the "Intermodal" category, a total of four evaluation criteria were selected with a distinct set of MOEs for each. The four criteria used to evaluate intermodal projects are as follows:

***Better Accommodates Intermodal Movements*:** This evaluation criterion uses a Multiple Choice MOE to classify the level at which a project will improve the efficiency of intermodal movements. The user must select between three classifications for a project with points awarded accordingly: Conflict Free Intermodal Movements (e.g., a grade-separated rail crossing), Limited Conflict Intermodal Movements (e.g., an at-grade rail crossing on facilities with low ADT), and Intermodal Movements Conflict (e.g., an at-grade rail crossing on a busy arterial with high ADT). It also is important to note that this criterion can be somewhat subjective with respect to the definition of a conflict. Therefore, decisions about how to classify a project under this criterion should be made objectively by HRTPO staff or an objective prioritization committee.

***Improving Vehicular Access to Freight Distribution Facilities, Ports, Major Industrial Clients, or Employment and Population Centers*:** This subcriterion uses a Multiple Choice MOE to determine the extent to which a project will improve existing access to freight distribution facilities, ports, etc. The user must choose between three classifications: Yes and Regional, Yes but Not Regional, or No. For a project to be classified as Yes and Regional and receive full points, it must improve vehicular access to one of the following: seaport, airport, military facility, connections between jurisdictions, or connections between major industrial/employment centers. If a project will improve vehicular access but will not include one of the regional facilities mentioned above, then it is classified as Yes but Not Regional and receives partial points. If the project does not improve access to any of these types of facilities, it should be classified as No and receives no points.

***Cost Effectiveness*:** This evaluation criterion uses a Calculated MOE to evaluate the ratio of revenue increase to overall cost of the project. The points awarded for this criterion are calculated automatically by taking the ratio of the estimated revenue increase divided by the estimated cost of the project (both of which are user-input values). Points are then awarded according to the designated threshold range with straight-line interpolation for values falling within the range.

***Enhances Other Categories*:** This evaluation criterion uses a Multiple Choice MOE to classify the degree to which a project will enhance other project categories. Enhancement to other categories could include the installation of bus shelters (“Transit” enhancement), installation of sidewalks or bike paths (“Bicycle and Pedestrian” enhancement), inclusion of HOV service (“Highways” enhancement), improvement to a water crossing (“Bridge/Tunnel” enhancement), or the implementation of a TDM initiative or ITS improvement (“Systems Management/TDM/Operational Improvements” enhancement). The user has a multiple choice selection of how many enhancements are included (None, One, Two, or Three or More), and points are allocated accordingly.

6.2 Measures of Effectiveness for Project Viability

A project’s viability level indicates the readiness of the project to be constructed based on available funding and completion of regulatory documentation. In general, the evaluation criteria used to assess project viability are the same for each of the six project categories. The evaluation criteria and accompanying MOEs for each project category are described below.

6.2.1 Project Viability Measures of Effectiveness – "Highways"

To assess a project's viability for the "Highways" category, a total of four evaluation criteria were selected with a distinct set of MOEs for each. The four criteria and their MOEs are as follows:

Amount of additional local match or private funding committed to the project: This criterion uses an Obtained MOE to evaluate the amount (in percentage of total project budget) of additional local or private funding committed to the project beyond the required match; however, points are awarded in a Multiple Choice MOE manner. Additional funding matches are divided into six segments, and points are awarded based on these levels of funding matching. It is important to note that even with 100 percent of additional match to local/state/federal funding, a project may still not be fully funded; however, the intent is to provide higher points to projects based on the degree of outside funding provided.

Prior Commitment: This criterion uses an Either/Or MOE to classify whether a project has prior commitment. A "Yes" is entered for this subcriterion only if a project is currently included in the LRTP and then full points are awarded; otherwise, a "No" is entered and no points are awarded.

Federal Mandates: This criterion uses an Either/Or MOE to classify whether a project is backed by federal mandates. A "Yes" is entered for this criterion only if a project is backed by documented federal mandates and then full points are awarded; otherwise, a "No" is entered and no points are awarded. Emergency bridge replacements, projects addressing significant existing design deficiencies, and projects with soon to expire federal funding previously allocated to the project are a few examples of federally mandated projects.

Degree of Project Readiness: This criterion is essentially a series of two Either/Or MOEs and one Multiple Choice MOE to assess how quickly a project could begin construction. Points are awarded cumulatively for answering "Yes" to each of the two following questions:

- Are the design plans complete, and is the project ready for advertisement?
- Is the project completely funded?

Additionally, full or partial points are awarded for the following question based on the level of environmental documentation completed to date.

- Have the necessary environmental plans/permitting been completed?

Full documentation includes all right-of-way and environmental permits. Partial documentation includes partial permitting or an approved environmental impact statement (EIS) document.

6.2.2 Project Viability Measures of Effectiveness – "Bridge/Tunnel"

To assess a project's viability for the "Bridge/Tunnel" category, a total of four evaluation criteria were selected with a distinct set of MOEs for each. The four criteria and their MOEs are as follows:

Amount of additional local match or private funding committed to the project: This criterion uses an Obtained MOE to evaluate the amount (in percentage of total project budget) of additional local or private funding committed to the project beyond the required match; however, points are awarded in a Multiple Choice MOE manner. Additional funding matches are divided into six segments, and points are awarded based on these levels of funding matching. It is important to note that even with 100 percent of additional match to local/state/federal funding, a project may still not be fully funded; however, the intent is to provide higher points to projects based on the degree of outside funding provided.

Prior Commitment: This criterion uses an Either/Or MOE to classify whether a project has prior commitment. A "Yes" is entered for this subcriterion only if a project is currently included in the LRTP and then full points are awarded; otherwise, a "No" is entered and no points are awarded.

Federal Mandates: This criterion uses an Either/Or MOE to classify whether a project is backed by federal mandates. A "Yes" is entered for this criterion only if a project is backed by documented federal mandates and then full points are awarded; otherwise, a "No" is entered and no points are awarded. Emergency bridge replacements, projects addressing significant existing design deficiencies, and projects with soon to expire federal funding previously allocated to the project are a few examples of federally mandated projects.

Degree of Project Readiness: This criterion is essentially a series of two Either/Or MOEs and one Multiple Choice MOE to assess how quickly a project could begin construction. Points are awarded cumulatively for answering "Yes" to each of the two following questions:

- Are the design plans complete, and is the project ready for advertisement?
- Is the project completely funded?

Additionally, full or partial points are awarded for the following question based on the level of environmental documentation completed to date.

- Have the necessary environmental plans/permitting been completed?

Full documentation includes all right-of-way and environmental permits. Partial documentation includes partial permitting or an approved EIS document.

6.2.3 Project Viability Measures of Effectiveness – "Bicycle and Pedestrian"

To assess a project's viability for the "Bicycle and Pedestrian" category, a total of four evaluation criteria were selected with a distinct set of MOEs for each. The four criteria and their MOEs are as follows:

Amount of additional local match or private funding committed to the project: This criterion uses an Obtained MOE to evaluate the amount (in percentage of total project budget) of additional local or private funding committed to the project beyond the required match; however, points are awarded in a Multiple Choice MOE manner. Additional funding matches are divided into six segments, and points are awarded

based on these levels of funding matching. It is important to note that even with 100 percent of additional match to local/state/federal funding, a project may still not be fully funded; however, the intent is to provide higher points to projects based on the degree of outside funding provided.

Prior Commitment: This criterion uses an Either/Or MOE to classify whether a project has prior commitment. A "Yes" is entered for this subcriterion only if a project is currently included in a comprehensive plan and then full points are awarded; otherwise, a "No" is entered and no points are awarded.

Federal Mandates: This criterion uses an Either/Or MOE to classify whether a project is backed by federal mandates. A "Yes" is entered for this criterion only if a project is backed by documented federal mandates and then full points are awarded; otherwise, a "No" is entered and no points are awarded. Emergency bridge replacements, projects addressing significant existing design deficiencies, and projects with soon to expire federal funding previously allocated to the project are a few examples of federally mandated projects.

Degree of Project Readiness: This criterion is essentially a series of two Either/Or MOEs and one Multiple Choice MOE to assess how quickly a project could begin construction. Points are awarded cumulatively for answering "Yes" to each of the two following questions:

- Are the design plans complete, and is the project ready for advertisement?
- Is the project completely funded?

Additionally, full or partial points are awarded for the following question based on the level of environmental documentation completed to date.

- Have the necessary environmental plans/permitting been completed?

Full documentation includes all right-of-way and environmental permits. Partial documentation includes partial permitting or an approved EIS document.

6.2.4 Project Viability Measures of Effectiveness – "Systems Management/TDM/ Operational Improvements"

To assess a project's viability for the "Systems Management/TDM/Operational Improvements" category, a total of four evaluation criteria were selected with a distinct set of MOEs for each. The four criteria and their MOEs are as follows:

Amount of additional local match or private funding committed to the project: This criterion uses an Obtained MOE to evaluate the amount (in percentage of total project budget) of additional local or private funding committed to the project beyond the required match; however, points are awarded in a Multiple Choice MOE manner. Additional funding matches are divided into six segments, and points are awarded based on these levels of funding matching. It is important to note that even with 100 percent of additional

match to local/state/federal funding, a project may still not be fully funded; however, the intent is to provide higher points to projects based on the degree of outside funding provided.

Prior Commitment: This criterion uses an Either/Or MOE to classify whether a project has prior commitment. A "Yes" is entered for this criterion only if a project is currently included in an official document and then full points are awarded; otherwise, a "No" is entered and no points are awarded.

Federal Mandates: This criterion uses an Either/Or MOE to classify whether a project is backed by federal mandates. A "Yes" is entered for this criterion only if a project is backed by documented federal mandates and then full points are awarded; otherwise, a "No" is entered and no points are awarded. Emergency bridge replacements, projects addressing significant existing design deficiencies, and projects with soon to expire federal funding previously allocated to the project are a few examples of federally mandated projects.

Degree of Project Readiness: This criterion is essentially a series of two Either/Or MOEs and one Multiple Choice MOE to assess how quickly a project could begin construction. Points are awarded cumulatively for answering "Yes" to each of the two following questions:

- Are the design plans complete, and is the project ready for advertisement?
- Is the project completely funded?

Additionally, full or partial points are awarded for the following question based on the level of environmental documentation completed to date.

- Have the necessary environmental plans/permitting been completed?

Full documentation includes all right-of-way and environmental permits. Partial documentation includes partial permitting or an approved EIS document.

6.2.5 Project Viability Measures of Effectiveness – "Transit"

To assess a project's viability for the "Transit" category, a total of four evaluation criteria were selected with a distinct set of MOEs for each. The four criteria and their MOEs are as follows:

Amount of additional local match or private funding committed to the project: This criterion uses an Obtained MOE to evaluate the amount (in percentage of total project budget) of additional local or private funding committed to the project beyond the required match; however, points are awarded in a Multiple Choice MOE manner. Additional funding matches are divided into six segments, and points are awarded based on these levels of funding matching. It is important to note that even with 100 percent of additional match to local/state/federal funding, a project may still not be fully funded; however, the intent is to provide higher points to projects based on the degree of outside funding provided.

Prior Commitment: This criterion uses an Either/Or MOE to classify whether a project has prior commitment. A "Yes" is entered for this criterion only if a project is currently included in the LRTP and then full points are awarded; otherwise, a "No" is entered and no points are awarded.

Federal Mandates: This criterion uses an Either/Or MOE to classify whether a project is backed by federal mandates. A "Yes" is entered for this criterion only if a project is backed by documented federal mandates and then full points are awarded; otherwise, a "No" is entered and no points are awarded. Emergency bridge replacements, projects addressing significant existing design deficiencies, and projects with soon to expire federal funding previously allocated to the project are a few examples of federally mandated projects.

Degree of Project Readiness: This criterion consists of a series of two Either/Or MOEs to assess how quickly a project could begin construction. Points are awarded cumulatively for answering "Yes" to each of the two following questions:

- Has the project received Federal Transit Authority (FTA) approval for final design?
- Has the project received environmental clearance?

6.2.6 Project Viability Measures of Effectiveness – "Intermodal"

To assess a project's viability for the "Intermodal" category, a total of four evaluation criteria were selected with a distinct set of MOEs for each. The four criteria and their MOEs are as follows:

Amount of additional local match or private funding committed to the project: This criterion uses an Obtained MOE to evaluate the amount (in percentage of total project budget) of additional local or private funding committed to the project beyond the required match; however, points are awarded in a Multiple Choice MOE manner. Additional funding matches are divided into six segments, and points are award based on these levels of funding matching. It is important to note that even with 100 percent of additional match to local/state/federal funding, a project may still not be fully funded; however, the intent is to provide higher points to projects based on the degree of outside funding provided.

Prior Commitment: This criterion uses an Either/Or MOE to classify whether a project has prior commitment. A "Yes" is entered for this criterion only if a project is currently included in the LRTP and then full points are awarded; otherwise, a "No" is entered and no points are awarded.

Federal Mandates: This criterion uses an Either/Or MOE to classify whether a project is backed by federal mandates. A "Yes" is entered for this criterion only if a project is backed by documented federal mandates and then full points are awarded; otherwise, a "No" is entered and no points are awarded. Emergency bridge replacements, projects addressing significant existing design deficiencies, and projects with soon to expire federal funding previously allocated to the project are a few examples of federally mandated projects.

Degree of Project Readiness: This criterion is essentially a series of two Either/Or MOEs and one Multiple Choice MOE to assess how quickly a project could begin construction. Points are awarded cumulatively for answering "Yes" to each of the two following questions:

- Are the design plans complete, and is the project ready for advertisement?
- Is the project completely funded?

Additionally, full or partial points are awarded for the following question based on the level of environmental documentation completed to date.

- Have the necessary environmental plans/permitting been completed?

Full documentation includes all right-of-way and environmental permits. Partial documentation includes partial permitting or an approved EIS document.

6.3 Measures of Effectiveness for Economic Vitality

While transportation plays a vital role in economic development, it cannot by itself create economic development. Using both literature and staff analysis, HRTPO staff have developed evaluation criteria on which to rank four of the six project categories based on economic vitality for the regional LRTP. This ranking is not a cost-benefit analysis, but rather an attempt to measure a particular project's potential to aid economic development throughout the entire region, as compared to the potential of other proposed projects within that category. The evaluation criteria and accompanying MOEs for the four project categories that will impact economic vitality are described below.

6.3.1 Economic Vitality Measures of Effectiveness – "Highways"

To assess a project's impact on economic vitality for the "Highways" category, a total of four evaluation criteria were selected with a distinct set of MOEs for each. The four criteria and their MOEs are as follows:

Total Reduction in Travel Time: Economic theory and empirical studies confirm that it is the travel time savings which result from an infrastructure project that creates both increased regional competitiveness and the opportunity for economic development. Using the HRTPO's travel demand model, each project will be measured for its ability to decrease travel time for the entire region, and will receive points based on its success meeting this measure.

Labor Market Access: This criterion measures the ability of workers to reach job sites within a region, as the availability of skilled labor plays a major role in business location decisions (this does not include temporary job sites that result from construction). This criterion measures how each project enhances economic vitality through improvements to labor market access based on the following two subcriteria:

- *Increases Travel Time Reliability:* Part of reducing the effective distance that workers travel is removing uncertainty about travel time, as travelers are less tolerant of unexpected delays and

schedule variations that cause them to be late for work or important personal appointments (e.g., picking up children from daycare or doctor's appointments). Staff analysis utilizing crash data, traffic counts, and variance of delay as well as technical expertise will be used to measure the impact each project would have on system wide travel time reliability.

- *Increases Access for Major Employment Centers:* The travel demand model will be used in conjunction with the most current long-range map of employment in Hampton Roads to determine the impact that each transportation project will have on access to high employment TAZs. This measure will utilize travel time savings for all trips that end in those TAZs.

Addresses the Needs of Basic Sector Industries: Basic sector industries are those that bring outside dollars into the region and create new income and additional spending power to the regional economy. Any increase in a basic sector industry's competitiveness will produce a correspondingly widespread effect on the regional economy (as opposed to changes in other industries that might only cause a realignment of incomes within a region). HRTPO staff have identified Defense, Commercial Maritime, and Tourism as the "super basic" sector industries in Hampton Roads on the basis of employment and outside dollars that are brought into the region. In order to assess whether a project addresses the needs of basic sector industries, three subcriteria were developed:

- *Increases Access for Defense Installations:* Defense installations are determined as TAZs that touch upon major military bases in the region. A project increases access to defense installations if it significantly reduces travel time for trips that end in those TAZs.

- *Increases Access to Tourist Destination:* Tourist destinations were determined to be those TAZs with tourism employment that is more than one standard deviation greater than average tourism employment for the region. A project increases access to tourist destinations if it significantly reduces travel time for trips that end in those TAZs.

- *Increases Access to Port Facilities:* Port facilities are those TAZs that provide critical access to a port. A project increases access to port facilities if it significantly reduces travel time for trips that end in those TAZs.

Increases Opportunity: This criterion measures a project's ability to bring in new dollars or businesses. The subcriteria included here are focused on the ability of a project to encourage economic development through encouraging the expansion of existing businesses or by the attraction of new businesses. This includes expanded and improved access to business locations as well as the role of a project locality's long term development plans. The two subcriteria are as follows:

- *Provides New or Increased Access:* This subcriterion looks at the ability of a project to allow new or increased access into an area in a way that would encourage economic development in that area.

- *Supports Plans for Future Growth:* This subcriterion examines whether a project has been included in a locality's (or multiple localities') comprehensive plan. It takes time to ensure that the proper infrastructure and zoning laws are in effect to account for the impact of new transportation projects, and this subcriterion therefore awards points for localities having already begun planning for this type of investment. Improvements that are located in areas specifically designated as a growth area in local comprehensive plans will receive the maximum number of points, and projects that are otherwise supported by a local comprehensive plan will receive partial points. HRTPO staff will assess jurisdictional comprehensive plans to determine the relative score.

6.3.2 Economic Vitality Measures of Effectiveness – "Bridge/Tunnel"

To assess a project's impact on economic vitality for the "Bridge/Tunnel" category, a total of four evaluation criteria were selected with a distinct set of MOEs for each. The four criteria and their MOEs are as follows:

Total Reduction in Travel Time: Economic theory and empirical studies confirm that it is the travel time savings which result from an infrastructure project that creates both increased regional competitiveness and the opportunity for economic development. Using the HRTPO's travel demand model, each project will be measured for its ability to decrease travel time for the entire region, and will receive points based on its success meeting this measure.

Labor Market Access: This criterion measures the ability of workers to reach job sites within a region, as the availability of skilled labor plays a major role in business location decisions (this does not include temporary job sites that result from construction). This criterion measures how each project enhances economic vitality through improvements to labor market access based on the following two subcriteria:

- *Increases Travel Time Reliability:* Part of reducing the effective distance that workers travel is removing uncertainty about travel time, as travelers are less tolerant of unexpected delays and schedule variations that cause them to be late for work or important personal appointments (e.g., picking up children from daycare or doctor's appointments). Staff analysis utilizing crash data, traffic counts, and variance of delay as well as technical expertise will be used to measure the impact each project would have on system wide travel time reliability.

- *Increases Access for Major Employment Centers:* The travel demand model will be used in conjunction with the most current long-range map of employment in Hampton Roads to determine the impact that each transportation project will have on access to high employment TAZs. This measure will utilize travel time savings for all trips that end in those TAZs.

Addresses the Needs of Basic Sector Industries: Basic sector industries are those that bring outside dollars into the region and create new income and additional spending power to the regional economy. Any increase in a basic sector industry's competitiveness will produce a correspondingly widespread effect on the regional economy (as opposed to changes in other industries that might only cause a realignment of

incomes within a region). HRTPO staff have identified Defense, Commercial Maritime, and Tourism as the "super basic" sector industries in Hampton Roads on the basis of employment and outside dollars that are brought into the region. In order to assess whether a project addresses the needs of basic sector industries, three subcriteria were developed:

- *Increases Access for Defense Installations:* Defense installations are determined as TAZs that touch upon major military bases in the region. A project increases access to defense installations if it significantly reduces travel time for trips that end in those TAZs.

- *Increases Access to Tourist Destination:* Tourist destinations were determined to be those TAZs with tourism employment that is more than one standard deviation greater than average tourism employment for the region. A project increases access to tourist destinations if it significantly reduces travel time for trips that end in those TAZs.

- *Increases Access to Port Facilities:* Port facilities are those TAZs that provide critical access to a port. A project increases access to port facilities if it significantly reduces travel time for trips that end in those TAZs.

Increases Opportunity: This criterion measures a project's ability to bring in new dollars or businesses. The subcriteria included here are focused on the ability of a project to encourage economic development through encouraging the expansion of existing businesses or by the attraction of new businesses. This includes expanded and improved access to business locations as well as the role of a project locality's long term development plans. The two subcriteria are as follows:

- *Provides New or Increased Access:* This subcriterion looks at the ability of a project to allow new or increased access into an area in a way that would encourage economic development in that area.

- *Supports Plans for Future Growth:* This subcriterion examines whether a project has been included in a locality's (or multiple localities') comprehensive plan. It takes time to ensure that the proper infrastructure and zoning laws are in effect to account for the impact of new transportation projects, and this subcriterion therefore awards points for localities having already begun planning for this type of investment. Improvements that are located in areas specifically designated as a growth area in local comprehensive plans will receive the maximum number of points, and projects that are otherwise supported by a local comprehensive plan will receive partial points. HRTPO staff will assess jurisdictional comprehensive plans to determine the relative score.

6.3.3 Economic Vitality Measures of Effectiveness – "Transit"

Transit (e.g., ferries, light rail, buses, and bus rapid transit) plays an important role in a regional economy by providing transportation alternatives to congestion and regional mobility and improving air quality. To assess a project's impact on economic vitality for the "Transit" category, a total of four evaluation criteria were selected with a distinct set of MOEs for each. The four criteria and their MOEs are as follows:

Labor Market Access: One goal of a transit system is to reduce the effective distance that workers have to travel to get to work. Transit does this by providing workers with an alternative to avoid congestion and allowing those workers who do not have access to a vehicle the ability to achieve regional mobility. In order to measure labor market access, four subcriteria were developed:

- *Increases Access for Major Employment Centers:* Research suggests that the location of employers has a far greater impact on ridership than the location of population,[17] partly because of the greater incentive of population to move to a line that allows access to a work location. Generally accepted planning practices suggest that the utility of transit project is maximized when transit terminals are set at a distance of no greater than ¼ mile from the point of origin or destination.[18] Staff ascertains that greater density of employment lends itself to greater transit ridership, and thus this subcriterion sums up all employment along the transit line in the TAZs where employment is one standard deviation above the regional mean. Points are awarded accordingly based on employment levels.

- *Increases Travel Time Reliability:* Part of reducing the effective distance that workers travel (i.e., the real cost of transit) is removing uncertainty about travel time reliability, as travelers are less tolerant of unexpected delays and schedule variations that cause them to be late for work or important personal appointments (e.g., picking up children from daycare or doctor's appointments). Confidence in travel time reliability enables travelers to have greater assurance in making their travel decisions, increasing the likelihood of utilizing the transit line. Points are awarded based on staff analysis of a project's ability to enhance travel time reliability. Staff recognizes that this measure will tend to reward projects that have a dedicated right of way.

- *Increases Frequency of Service:* This subcriterion estimates the number of times the transit line provides service to the stop. The HRTPO staff will use data from HRT and WATA and make a judgment of the frequency of service to award points.

- *Provides Access to Institutions of Higher Education:* A highly educated/skilled workforce is critical for regional competitiveness, and anything that aids a region in developing its workforce will increase its long term economic growth. Full points are awarded for transit projects that have either a two or four year academic institution within ½ mile of its route.[19]

[17] Tsai, Yu-Hsin. (2009) "Impacts of self-selection and transit proximity on commute mode choice: evidence from Taipei rapid transit system." Annals of Regional Science 43: 1073-1094

[18] Wu, C., & Murray, A. T. (2005). Optimizing Public Transit Quality and System Access: the Mulitple-route, Maximal covering/shortest-path problem. Environment and Planning B: Planning and Design , 32, 163-178.

[19] The literature review indicated that two groups have lower sensitivity to walking distance from transit: students, because they tend to be younger, and the economically disadvantaged, because they have fewer options.

Addresses the Needs of Basic Sector Industries: Basic sector industries are those that bring outside dollars into the region and create new income and additional spending power for the regional economy. Any increase in a basic sector industry's competitiveness will produce a correspondingly widespread effect on the regional economy (as opposed to changes in other industries that might only cause a realignment of incomes within a region). HRTPO staff have identified Defense, Commercial Maritime, and Tourism as the "super basic" sector industries in Hampton Roads on the basis of employment and outside dollars that are brought into the region. In order to assess whether a transit project addresses the needs of basic sector industries, two subcriteria were developed (Ports were not included because staff analysis determined that port activity is not significantly affected by transit access):

- *Provides or Improves Access for Defense Installations:* This subcriterion awards points to transit projects that pass within ¼ or ½ mile of a major defense installation.

- *Increases Access to Tourist Destinations:* Tourist destinations were determined to be those TAZs with tourism employment that is more than one standard deviation greater than average tourism employment for the region. Points are awarded accordingly to transit projects having high density tourism employment within a ¼ or ½ mile of the line that falls within a designated range based on the total tourism employment in the region of approximately 160,000.

Increases Opportunity: This criterion measures a project's ability to bring in new dollars or businesses. The subcriteria included here are focused on developing an improved transit network as a measure of the region's amenities for both workers and business location decisions, as well as whether the transit project is included in the long-range plan of the city. The two subcriteria are as follows:

- *Provides New Access to the Network:* This measure looks at the enhancement that an individual project makes to the overall transit network in the region, including all forms of transit. It is clear that synergies develop as a transit network reaches a certain level of maturity, and this subcriterion attempts to capture an individual project's ability to improve the network and enhance the general amenity level of the region. Points are awarded based on staff assessment of the project.

- *Supported by Plans for Increased Density and Economic Activity:* This subcriterion examines whether a project has been included in a locality's (or multiple localities') comprehensive plan. It takes time to ensure that the proper infrastructure and zoning laws are in effect for the area along a new transit line, and this subcriterion therefore awards points for localities having already begun planning for this type of investment. Full points are awarded to projects with strategic growth areas (such as enterprise zones, empowerment zones, and technology zones), and partial points are awarded to projects located in areas that have plans for increased density. HRTPO staff will assess jurisdictional comprehensive plans to determine the relative score.

Economic Distress Factors: It is clear that economic justice requires that the transportation system include those who live in economically disadvantaged areas, and thus points are included for projects that pass

through an area in some level of economic distress. Also, as these areas often have lower costs of rental/ownership, this category also increases access to affordable housing for the entire workforce. In order to assess a transit project's level of access to economically disadvantaged areas, two subcriteria were developed:

- *Provides Access to Areas with High Unemployment:* This subcriterion looks at the unemployment rate as a measure of economic distress. In order to capture areas of extreme economic distress, this measures the unemployment in the most distressed TAZ along the route and compares it to the regional average.

- *Provides Access to Low Income Areas:* This subcriterion examines the area median income of the TAZs within ¼ mile and ½ mile of the transit line and compares it to the poverty level.[20] Points are awarded to projects based on the proximity of TAZs that have income levels falling within a designated threshold when compared to the poverty level.

6.3.4 Economic Vitality Measures of Effectiveness – "Intermodal"

To assess a project's impact on economic vitality for the "Intermodal" category, a total of five evaluation criteria were selected with a distinct set of MOEs for each. The five criteria and their MOEs are as follows:

Total Reduction in Travel Time: Economic theory and empirical studies confirm that it is the travel time savings which result from an infrastructure project that creates both increased regional competitiveness and the opportunity for economic development. Using the HRTPO's travel demand model, each project will be measured for its ability to decrease travel time for the entire region, and will receive points based on its success meeting this measure.

Labor Market Access: This criterion measures the ability of workers to reach job sites within a region, as the availability of skilled labor plays a major role in business location decisions (this does not include temporary job sites that result from construction). This criterion measures how each project enhances economic vitality through improvements to labor market access based on the following two subcriteria:

- *Increases Travel Time Reliability:* Part of reducing the effective distance that workers travel is removing uncertainty about travel time, as travelers are less tolerant of unexpected delays and schedule variations that cause them to be late for work or important personal appointments (e.g., picking up children from daycare or doctor's appointments). Staff analysis utilizing crash data, traffic counts, and variance of delay as well as technical expertise will be used to measure the impact each project would have on system wide travel time reliability.

- *Increases Access for Major Employment Centers:* The travel demand model will be used in conjunction with the most current long-range map of employment in Hampton Roads to

[20] See footnote 21 about why ½ mile rather than ¼ mile radius was used.

determine the impact that each transportation project will have on access to high employment TAZs. This measure will utilize travel time savings for all trips that end in those TAZs.

Impact on Truck Movement: HRTPO Transportation staff will analyze the impact of an intermodal project on regional truck movement using freight volumes, crash data, and capacity estimates. Movements of goods are critical for the region's economic growth, and thus elements that greatly increase the movement of trucks will be awarded the category's full allotment of points.

Improves Interaction between Modes of Travel: Intermodal traffic refers to traffic that moves containers of goods from one mode of travel to another with limited re-handling. Ease of handling will be a primary driver for the use of Hampton Roads as a thoroughfare for the nation's cargo. HRTPO Transportation staff will analyze the impact of projects on access to each of the other modes of travel (seaport, airport, and rail).

Increased Opportunity: This criterion measures a project's ability to bring in new dollars or businesses. The subcriteria included here are focused on the ability of a project to encourage new or increased development by businesses, with particular focus on the transportation and warehousing industry. The two subcriteria are as follows:

- *Provide New or Increased Access:* This subcriterion looks at the ability of a project to allow increased or expanded access to an existing area, or to open a new access to an area that is primed for development, but was previously inaccessible.

- *Supports Plans for Future Growth:* This subcriterion examines whether a project has been included in a locality's (or multiple localities') comprehensive plan. It takes time to ensure that the proper infrastructure and zoning laws are in effect to account for the impact of new intermodal projects, and this subcriterion therefore awards points for localities having already begun planning for this type of investment. Improvements that are located in areas specifically designated as a growth area in local comprehensive plans will receive the maximum number of points, and projects that are otherwise supported by a local comprehensive plan will receive partial points. HRTPO staff will assess jurisdictional comprehensive plans to determine the relative score.

7. Program Prioritization Tool and Project Application Form

In conjunction with the development of a methodology, a Program Prioritization tool was developed, allowing users to easily apply the weighted MOEs to projects within the LRTP. The prioritization tool was structured to provide a convenient, interactive, user-friendly, simple, and versatile method to score and sort projects. A project application form was also developed to gather the data necessary to score each project.

7.1 General Overview/Structure of the Tool

The Program Prioritization tool was developed to provide a user-friendly method to efficiently input data and generate a project score for projects within the LRTP based on established evaluation criteria and MOEs. The tool was developed in an electronic spreadsheet (Excel) format with Visual Basic Macro programs. The spreadsheet contains individual tabs for each project category's inputs, project weighting factors, a reference tab containing drop-down menu inputs to improve data entry efficiency, and individual project category results. The tool contains a separate tab for each of the six project categories:

1. "Highways"
2. "Bridge/Tunnel"
3. "Bicycle and Pedestrian"
4. "Systems Management/TDM/Operational Improvements"
5. "Transit"
6. "Intermodal"

Once all category and background inputs are entered, individual project scores are tabulated from the established weighting factors. Macros were developed to automatically sort projects by a project utility score and a project viability grade. Additional macros were developed to further sort "Highways" and "Bridge/Tunnel" projects by roadway system as well as by individual evaluation criteria to provide further guidance on project evaluation. As the tool is refined in the future, consideration may be given to slightly restructuring the result outputs to more closely sort projects with specific funding sources.

Given the interactive nature of the prioritization process, the tool was structured to allow users to easily modify project weighting factors or MOE thresholds. While it is understood that project parameters change, revisions to project weighting factors and MOE thresholds should only be based upon project attributes. If and when inputs are adjusted, project scores are automatically recalculated and organized with the assigned macros. User-friendly alerts also are incorporated into the tool, which will notify the user if project point values do not equal 100 points. Additionally, with the use of cell notes and drop-down menus, the tool provides a straightforward data entry platform.

A detailed summary of the tool structure and data inputs is presented in **Appendices G1 and G2**.

7.2 Project Application Form

In order to obtain project specific data inputs for the tool such as background information and evaluation criteria information for each project, an application form was developed. This form will be made available by the HRTPO such that each municipality or agency will be responsible for providing a portion of the objective inputs while all subjective inputs will be entered by a neutral party. Given the different evaluation criteria established for each of the six project categories, separate application forms were developed for each category. The application forms are included in **Appendix H**.

7.3 Tool Application

Application of the Program Prioritization tool includes three main steps as illustrated in **Figure 14**. Pertinent project data is obtained from the submitting agency via the project application form. Additional data may be obtained from HRTPO staff and/or VDOT depending on the nature of the project and required data needed. Further refinement may be required as more subjective values will need to be re-examined. The user has the ability to modify the weighting factors and MOEs and immediately observe the new project scores within each category. However, it is suggested that if the results appear inconsistent, the user should first review the accuracy of the data followed by evaluating the thresholds associated with the MOEs, and then only as a final effort, consider adjusting the weighting factors.

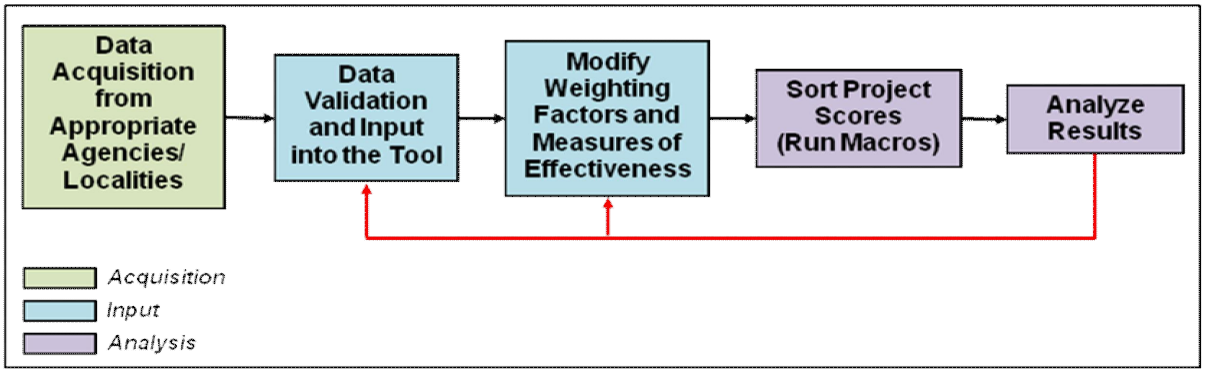

Figure 14 - Tool Application Flow Chart

It is essential to understand that this report's objective is to provide a very efficient and valid first attempt at a highly iterative process. A tool validation analysis was completed for a sampling of projects considering the project utility and project viability components and is included in **Appendix I**. Input of additional projects and further refinement of data, weighting factors, and MOEs will be necessary hereafter to complete the project ranking. However, this effort will be the responsibility of the agency who inherits the scoring tool.

7.4 Tool Administration

The HRTPO will have the primary responsibility in maintaining the tool. However, future refinements of the methodology (categories, evaluation criteria, weighting factors, MOEs, and point allocations) should be consensus-based with the support of TTAC and HRTPO Board approval. The tool and methodology

should be reviewed and reevaluated concurrent with the development of each LRTP update. When reevaluating the methodology and tool, the vision and goals of the region should serve as the benchmark for any modifications. If modifications are deemed necessary, the proposed revisions should be presented to and endorsed by the HRTPO Board prior to inclusion.

If new projects are proposed in between scheduled LRTP updates, it is the responsibility of HRTPO staff to maintain the projects and background inputs included within the tool. This includes validating any and all new input data obtained for either new projects or new MOEs.

8. Conclusions and Next Steps

The Program Prioritization methodology and tool is intended to provide policy makers with three pieces of project information: a valid and representative ranking of projects based on technical merit, the current viability of the project to be implemented, and the project's relative contribution to the economic vitality of the region. While the Program Prioritization process provides a ranking of projects through a validated methodology, the ultimate determination of the region's top priorities and how available funding is allocated still requires a consensus-based decision making process with the HRTPO Board members. The intent of the Program Prioritization process is to provide a scoring and ranking of projects which will aid the HRTPO members when making a consensus-based decision on the overall program and priority projects.

8.1 Project Status

At the onset of this project, it was understood that the Program Prioritization methodology and tool would be a living process and document that would be modified and refined through time, as priorities and funding change and the tool is tested more extensively. This report concludes the development of the initial tool. The initial tool, which included a one-part scoring process, was refined twice based on input from the TTAC, TAC, and HRTPO Board members; HRTPO staff; and the Steering Committee to incorporate a three-part scoring process which evaluates project utility, project viability, and economic vitality separately. It is anticipated that the Program Prioritization methodology and tool will be utilized by HRTPO staff in the development of the 2034 LRTP after some additional refinement as follows:

- Initial Program Prioritization methodology and tool utilizing a one-part scoring process completed by KHA – Fall 2009
- Program Prioritization methodology and tool refined by KHA to include a two-part (project utility and project viability) scoring process – Winter 2009/2010
- Program Prioritization methodology and tool refinement by HRTPO staff and KHA to include a three-part (project utility, project viability, economic vitality) scoring process –Spring 2010
- Development of a LRTP candidate application form for application within the prioritization tool - Spring 2010
- HRTPO Board approval of final Program Prioritization methodology and tool for use in development of 2034 LRTP – Summer 2010

8.2 Next Steps

Recognizing this is a living document, revision efforts will still be an ongoing task after the current Program Prioritization tool has been provided to HRTPO staff for use in developing the 2034 LRTP. The current tool will likely need further refinements to a number of data inputs and MOEs. Some data inputs, such as cost effectiveness measures for "Intermodal" projects, pavement condition scores, and crash history, were

difficult to obtain within the time constraints of the initial tool development. Further efforts will need to be made to obtain more reliable and exact data or perhaps to determine a substitute MOE which utilizes more readily available data. Some of the more subjective MOEs may need to be clarified with a numerical scale, and the project viability and economic vitality components may need to be better quantified with refined MOEs such that applicants can identify and improve on selected projects to meet predefined measureable objectives. Based on discussions with HRTPO staff and the Steering Committee, TTAC, TAC, and HRTPO Board members, it also is anticipated that the tool may be further refined to align project-specific funding sources within the six categories.

It is recommended that these further refinements be considered and addressed after using the tool to develop the 2034 LRTP. In implementing the tool to develop the 2034 LRTP, immediate efforts will be necessary to obtain input data for the approximately 200 candidate projects so that they can be properly scored and ranked. This will require consistent coordination between HRTPO staff and the Steering Committee, TTAC, and HRTPO Board members to obtain the appropriate information and background data for each project from the project applicants. A reevaluation of the linear interpolation thresholds for various criteria under each of the six categories also will be necessary as the ultimate project scoring is performed.

With subsequent plan updates after the 2034 LRTP (i.e., 2038 and beyond), the evaluation criteria and weighting factors should be reevaluated and updated as needed to reflect changing regional goals and visions for Hampton Roads.

Appendix A

Compliance Description of the Eight SAFETEA-LU Federal Planning Factors

Addressing the Eight Federal Planning Factors:

Factor 1: Support the economic vitality of the metropolitan area, especially by enabling global competitiveness, productivity, and efficiency.

Supporting economic growth and development was an explicitly identified goal in the development of the prioritization process. With this goal in mind, a separate and distinct economic vitality component was developed for the "Highways," "Bridge/Tunnel," "Transit," and "Intermodal" project categories to evaluate the ability of a project to impact regional economic growth through increased capacity and/or increased opportunity. Criteria were developed t o measure how improvements in the region's transportation network reduce constraints on commerce and industry, improve productivity and labor market access, and expand opportunity for new businesses throughout Hampton Roads.

Some of the evaluation criteria for each category's economic vitality component consider the following:

1) How well a project contributes to reductions in travel time
2) How well a project provides labor market access by improving travel time reliability and increasing access to major employment centers
3) How well a project addresses the needs of basic sector industries such as defense, tourism, and ports
4) How well a project is supported by plans for future growth and development
5) How well a project increases opportunity for business development based on new or increased access
6) How well a project increases access to other modes of travel for the movement of goods

Factor 2: Increase the safety of the transportation system for all motorized and non-motorized users.

Safety was identified by the Steering Committee as well as the technical and public survey respondents as a major factor in prioritizing transportation projects. Specific evaluation criteria were developed to evaluate safety impacts associated with proposed projects. These criteria included measures of effectiveness (MOEs) such as crash reductions (between vehicles and pedestrians), crash rate reductions, improvements to evacuation or incident management routes, improvements to geometric deficiencies, and improvements to intermodal movement conflicts. Additionally, an evaluation criterion which measures the infrastructure condition of highways, bridges, and tunnels also addresses existing safety concerns.

The "Highways," "Bridge/Tunnel," "Bicycle and Pedestrian," "Systems Management/TDM/Operational Improvements," and "Intermodal" project categories all include specific safety evaluation criteria.

Factor 3: Increase the ability of the transportation system to support homeland security and to safeguard the personal safety of all motorized and non-motorized users.

Given the significant military presence and the potential for severe weather conditions such as hurricanes in the Hampton Roads region, security was another priority when developing evaluation criteria for the six categories. Understanding that the operations of the roadways, bridges, and tunnels throughout Hampton Roads are critical during evacuations and other incidents, priority is given to

"Highways" and "Bridge/Tunnel" projects that improve incident management or evacuation routes. In addition, the "Bridge/Tunnel" category has a criterion which considers the potential regional impacts, in terms of operations, of a sudden bridge or tunnel failure. "Systems Management/TDM/Operational Improvements" projects are also evaluated based on improvements to incident management or evacuation routes as well as provisions for emergency vehicle preemption and incident detection.

Factor 4: Increase the accessibility and mobility of people and freight.

This planning factor was accounted for in all six project categories. Specifically, the Hampton Roads prioritization process values projects which:

- Reduce vehicular congestion on the regional roadway network
- Improve system continuity and connectivity for the regional roadway, bicycle and pedestrian, and transit networks
- Encourage the use of alternate travel modes (walking and biking, transit, ridesharing, etc.)
- Enhance the use of other modes (e.g., a roadway project which includes a multiuse path)
- Improve rail or vehicular access to major destinations such as freight distribution facilities, airports/seaports, major industrial clients, employment and population centers, or rail stations/terminals
- Improve transit, bicycle, and pedestrian access to employment and population centers
- Address the mobility and accessibility needs of the region as a whole
- Better accommodate intermodal movements of people and freight

Factor 5: Protect and enhance the environment, promote energy conservation, improve the quality of life, and promote consistency between transportation improvements and State and local planned growth and economic development patterns.

This planning factor was accounted for in all six project categories. Specifically, the Hampton Roads prioritization process values projects which:

- Reduce vehicular emissions by reducing congestion and increasing system efficiencies
- Are compatible with existing land use patterns and future growth and development (based on consistency with state and local planning documents)
- Support economic growth and vitality across the region

Factor 6: Enhance the integration and connectivity of the transportation system, across and between modes, for people and freight.

This planning factor was accounted for in all six project categories. Specifically, the Hampton Roads prioritization process values projects which:

- Improve system continuity and connectivity for the regional roadway, bicycle and pedestrian, and transit networks
- Provide multimodal accommodations (e.g., a roadway project which includes a multiuse path)

- Improve rail or vehicular access to major destinations such as freight distribution facilities, airports/seaports, major industrial clients, employment and population centers, or rail stations/terminals
- Improve pedestrian and bicycle access to transit as well as local and regional destinations
- Better accommodate intermodal movements of people and freight

Factor 7: Promote efficient system management and operation.

Efficient system management and operation are promoted in the Hampton Roads prioritization process through the emphasis on congestion mitigation. Congestion mitigation was identified by the Steering Committee as well as the technical and public survey respondents as a major factor in prioritizing transportation projects. The "Highways," "Bridge/Tunnel," and "Systems Management/TDM/ Operational Improvements" project categories all include specific evaluation criteria based on congestion levels while the "Transit" category includes travel time reductions as an MOE. "Intermodal" projects which remove conflicts between intermodal movements and thereby improve operations also are prioritized. In addition, the "Systems Management/TDM/Operational Improvements" project category places emphasis on systems management by prioritizing projects which improve communications among multiple operating agencies.

Factor 8: Emphasize the preservation of the existing transportation system.

With limited funding available for new infrastructure, it is now more important than ever to manage the current transportation assets in Hampton Roads. The "Highways" and "Bridge/Tunnel" project categories each include infrastructure condition as an evaluation criterion. Priority is given to facilities with poor existing infrastructure conditions (based on nationwide standards). In addition, projects included in the "Systems Management/TDM/Operational Improvements" category (such as signal retiming and ITS solutions) are inherently designed to improve operations without major infrastructure improvements. TDM programs are implemented to encourage ridesharing, walking/biking, and parking management practices which manage the overall transportation demand for a given destination and reduce the need to build additional infrastructure.

Appendix B

RSTP Criteria and Weighting Factors

(Courtesy of the 2003 HRTPO CMAQ/RSTP Report)

Project Prioritization:

Selected projects are assigned to fiscal years based on priority and on project readiness.

RSTP PROJECT EVALUATION METHOD BY PROJECT CATEGORY

Project Category	Evaluation Method
Highway Capacity, Accessibility & Operational Improvements - Roadway widening, new facilities, HOV lanes, new interchanges, Intersection improvements - Corridor operational improvements - Bridge rehabilitation	 See Table 2 See Table 3 See Table 4
Intermodal Transportation Projects - Intermodal facilities	See Table 5
Transit - New service, Expansion of Service, Shelters & Facilities (Bus, fixed-guideway, HOV express) - Vehicle replacement/purchase - Other transit & ITS projects	 See Table 6 See Table 7 See Table 8
Planning Studies - Alternatives Analysis - Feasibility Studies	See Table 9
Transportation Demand Management - Regional rideshare - Marketing & outreach - HOV lane express bus service - Park-&-ride lots	See Table 10
Intelligent Transportation Systems	See Table 11

HIGHWAY CAPACITY, ACCESSIBILITY AND OPERATIONAL IMPROVEMENTS

Table 2
Roadway Widening, New Facility, HOV Lanes, Intersection Improvements

Evaluation Criteria	Points	Scoring Instructions
Congestion Level	0-20	Existing and future conditions (10 points each): severe=7, moderate=3, low=0
Cost-Effectiveness	0-20	Lowest cost/vmt = 20 Highest cost/vmt = 0 Straight line interpolation between
System Continuity	0-20	Completion of a missing link in the transportation system Total completion = 20 Partial completion = 10
Safety	0-20	20 points to the project with highest safety improvements
Air Quality	0-10	Reduces NOx =5 points Reduces HC=5 points
Project Readiness	0-10	Projects with detailed design and cost estimates that are ready to go will receive 10 points

Table 3
Corridor Operational Improvements

Evaluation Criteria	Points	Scoring Instructions
Arterial LOS based on Average Travel Speed	0-25	Relative Scale- maximum points to arterial with lowest average speed (worst LOS), 0 to arterial with LOS C or better
ADT of Roadway	0-20	Existing and future ADT (10 points each). Relative scale - maximum points to highest corridor ADT/Lane
Cost-Effectiveness	0-35	Relative Scale- maximum points to the project with lowest cost/vmt
Existing Accident Experience	0-20	Relative Scale- maximum points to the project With highest accident rate or frequency
Project Readiness	0-10	Projects with detailed design and cost estimates that are ready to go will receive 10 points

HIGHWAY CAPACITY, ACCESSIBILITY AND OPERATIONAL IMPROVEMENTS

Table 4
Bridge Rehabilitation

Evaluation Criteria	Points	Scoring Instructions
Bridge Condition per VDOT Sufficiency Index	0-60	Relative Scale- maximum points to the bridge with worst condition
ADT of Bridge	0-30	Relative Scale- maximum points to the bridge with highest ADT
Project Readiness	0-10	Projects with detailed design and cost estimates that are ready to go will receive 10 points

INTERMODAL TRANSPORTATION PROJECTS

Table 5
Intermodal Facilities

Evaluation Consideration	Points
Will the project establish opportunities for linkages or connections between transportation modes or existing corridors or centers?	Up to 40 points
Will the project improve the operating system to better accommodate intermodal movements?	Up to 25 points
Will the project improve rail or vehicular access to freight distribution facilities, ports, or major industrial clients?	Up to 25 points
Project Readiness Projects with detailed design and cost estimates that are ready to go will receive 10 points	Up to 10 points

TRANSIT

Table 6
New Service, Expansion of Existing Service, Facilities, etc.

Evaluation Criteria	Points	Scoring Instructions
Congestion relief	0-10	Impacts of new/expanded service on area highways- 10 points to the project with the highest % of trips removed from highways; 0 points to the project with no impact on adjacent highway.
Facility Usage- Daily Ridership	0-20	Relative Scale Highest ridership=20 points Lowest ridership=0 points
Cost Effectiveness - Subsidy/ passenger (or use other FTA formula depending on the project)	0-20	Relative scale Lowest subsidy/passenger=20 Highest subsidy/passenger=0
Air Quality	0-20	NOX reductions=10 HC reductions=10
Coverage Area	0-20	Relative scale - Population and Employment data.
Project Readiness	0-10	Projects with detailed design and cost estimates that are ready to go will receive 10 points

Table 7
Vehicle Replacement/Purchase

Evaluation Criteria	Points	Scoring Instructions
Average age of the vehicles	35	FTA standard=12 years
Number of vehicles to replace/total fleet	10	
Emissions changes of the old and new vehicles	30	
Cost Effectiveness	10	Cost/Ridership
Average mileage of the vehicles to be replaced	15	FTA Standards

TRANSIT

Table 8
Other Transit and ITS Projects

Evaluation Consideration	Points
Will the project increase service reliability of the transit system?	0-25
Will the project improve passenger safety, comfort and convenience?	0-30
Does the project improve efficiency of the transit system?	0-10
Does the project improve the revenue collection?	0-25
Does the project improve transit data collection system?	0-10

PLANNING STUDIES

Table 9
Alternatives Analysis & Feasibility Studies

Evaluation Consideration	Points	Yes or No
1) Is the study necessary to address a major issue or to revise the Plan?	0-25	
2) Is the study necessary to address a safety issue?	0-15	
3) Is the study concerned with encouraging multimodal transportation?	0-10	
4) Does the study address the mobility or accessibility needs of the region?	0-20	
5) Is the study well defined in terms of purpose, design concept and scope?	0-10	
6) Do the goals and objectives of the study show support for economic development?	0-10	
7) Do the goals and objectives demonstrate preservation or protection of the environment?	0-10	

TRANSPORTATION DEMAND MANAGEMENT

Table 10
Regional Rideshare, Marketing & Outreach, HOV Lane Express Bus Service, Park-and Ride Lots, Telecommuting, etc. The TDM Committee developed the following criteria. Measures will be evaluated against the base year's figures (TDM Manager will provide appropriate data for base and target years).

Measures of Success	Base Year	Target Year
Number of employers offering some TDM programs		
% of employees ridesharing (car, van, bus)		
% of employees walking or biking		
Number of contacts made		
Parking Management (availability, price, zoning requirements)		
Mixed use land use (trip reduction)		
HOV usage/ Vehicle occupancy rates		
Other measures		

INTELLIGENT TRANSPORTATION SYSTEMS

Table 11
ITS Projects

Evaluation Consideration	Points
Will the project improve traffic flow during peak congestion periods and special events?	0-15
Will the project directly reduce the number or severity of accidents, which occur on roadways?	0-25
Will the project improve level of service, increase service capacity, or contribute to incident management?	0-20
Does the project address the mobility or accessibility needs of the region?	0-10
Does the project improve the linkage and communications among various operating agencies to provide better and accurate traffic information to the motorists?	0-20
Is the project part of the Regional ITS Strategic Plan?	0-10

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Appendix D

Nationwide Benchmark Agency Research -
Additional Methodology Information

(Courtesy of Each Individual Agency)

Fredericksburg Area MPO
(FAMPO)

Project Prioritization Methodology

Recommended Approach

FAMPO

Project Prioritization Methodology

Recommended Approach

June 17, 2008

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Prioritization Approach

Introduction

To understand the long-term transportation needs of a region, carefully prepared and executed planning processes are undertaken. These processes compile existing and future transportation system and usage information, as well as other non-technical considerations and elements to identify the comprehensive set of transportation infrastructure, policy, and service modifications that are necessary to accommodate existing and future travel demand by all modes of transportation. In any plan area, differing projects have differing costs and benefits (relative and absolute). In addition, for plans encompassing multiple jurisdictions, regional priorities may differ widely from local priorities.

Understanding that there are practical limitations to the implementation of transportation improvement projects, a regimented system for determining the relative value of all projects when compared to one another generally (all modes and project types together), and when compared to one another within specific groupings, is needed. The Fredericksburg Area Metropolitan Planning Organization has developed a proposed recommended Project Prioritization Methodology to assist in the setting of priorities for projects identified as a part of the Regional Long-Range Transportation Plan.

Background

The FAMPO proposed recommended Project Prioritization Methodology is based on the collective experience of other Metropolitan Planning Organizations and localities, the eight SAFETEA-LU Federal Planning Factors, and the FAMPO Mission Statement. The following is a brief summary of factors evaluated for use, the eight Federal Planning Factors, and the FAMPO Mission Statement.

Summary of Factors Considered

- Congestion
- Economic Opportunities
- Safety
- Security
- Public Support
- Environmental Impacts
- Funding, Local Matches, and Prior Funding Commitments
- Cost
- Regional Connectivity
- Gap Closure
- Deliverability/Readiness
- Freight Mobility
- Emergency Evacuation
- Improve Mobility for Disadvantaged
- Sustainability
- Local Priority

- Benefit/Cost Ratio
- Remaining Life Cycle and Existing Conditions

SAFETEA-LU: Federal Planning Factors

1. Support the economic vitality of the United States, the States, metropolitan areas, and non-metropolitan areas, especially by enabling global competitiveness, productivity, and efficiency;
2. Increase the safety of the transportation system for motorized and non-motorized users;
3. Increase the security of the transportation system for motorized and non-motorized users;
4. Increase accessibility and mobility of people and freight;
5. Protect and enhance the environment, promote energy conservation, improve the quality of life, and promote consistency between transportation improvements and State and local planned growth and economic development patterns;
6. Enhance the integration and connectivity of the transportation system, across and between modes and throughout the State, for people and freight;
7. Promote efficient system management and operation; and
8. Emphasize the preservation of the existing transportation system

FAMPO Mission Statement

The Fredericksburg Metropolitan Area Planning Organization's (FAMPO) mission is to provide a cooperative, continuous and comprehensive ("3C") transportation planning process to build regional agreement on transportation investments that balance roadway, public transit, bicycle, pedestrian, and other transportation needs and support regional land use, economic, and environmental goals for the safe and efficient movement of people and goods. Special emphasis is placed on providing equal access to a variety of transportation choices and effective public involvement in the transportation planning process.

Proposed Recommended Methodology

This proposed recommended methodology uses readily accessible information in evaluating projects based on the following major factors and project classifications:

- **Congestion relief:** 30 points
- **Safety and security:** 30 points
- **Environmental impacts:** 16 points
- **Public and community support:** 8 points
- **Funding and implementation considerations:** 8 points

- **Smart growth/mobility:** 8 points

These factors are consistent with FAMPO's mission, build on the relevant factors used in other areas for project prioritization, and fulfill each of the eight Federal Planning Factors, as summarized in **Table 1.0**. The recommended project classifications are the following:

Level I

- **Urban:** includes projects in designated urban areas
- **Rural:** includes projects in designated rural areas

Level II

- **Interstate:** includes interstate mainline projects, projects for new and improved interchanges, and interstate ramp projects (does not include surface street crossings of the interstate not having ramps to the interstate)
- **Arterial:** includes facilities (non-interstate) within the arterial functional classification
- **Collector:** includes facilities within the collector functional classification
- **Local:** includes facilities within the local functional classification
- **Bridge:** includes bridge projects divided into the following two groups:
    - Replacement
    - Rehabilitation and maintenance

Table 1.0: Summary of Federal Planning Factors and Proposed Recommended Prioritization Criteria

	Recommended FAMPO Prioritization Factor					
Federal Planning Factor	1. Congestion Relief	2. Safety and Security	3. Environmental Impacts	4. Public/ Community Support	5. Funding/ Implementation Considerations	6. Smart Growth/Mobility
1. Economic Vitality						X
2. Safety		X				
3. Security		X				
4. Accessibility	X					X
5. Environment			X	X		
6. Integration	X					

and Connectivity						
7. Efficiency	X	X			X	X
8. Existing Network Preservation	X	X				

By evaluating projects based on factors within these major categories, projects are scored on a 100 point scale. Projects with the highest score are technically identified as higher priorities than those earning lower scores.

Application of Factors: Project Ranking Process

1. **Apply prioritization factors**
   - Quantitative factors
   - Qualitative factors

2. **Add totals within individual categories**

3. **Add totals of categories**

4. **Prioritize (rank) projects**
   - Step 1—Organize projects into Urban and Rural
   - Step 2—Organize projects into the following categories: Interstate, Arterial, Collector, Local, and Bridges *[divided into A) Replacement and B) Rehabilitation/Maintenance]*
   - Step 3—Rank categorized projects from highest to lowest scores
   - Step 4 (optional)—Separate projects for individual jurisdictions (within categories)

5. **Review information**

6. **Projects with highest score (nearest 100) are highest priority based on factors**

7. ***Review by Staff, TAC, and Board to identify acceptable exceptions***

Scoring Categories, Point Values, and Descriptive Guidance

The following sections are intended to guide the scoring of projects and provide detailed descriptions of each factor in the major categories and the measures for assigning point values to projects.

1. Congestion Relief (30 points)

Congestion (14 points): Level of current and future congestion

Existing level of congestion = existing volume/existing capacity
7 points: V/C>1.5
5 points: V/C≥1.0 and V/C<1.5
2 points: V/C≥0.9 and V/C<1.0
0 points: V/C<0.9

Future level of congestion = future volume/existing capacity
7 points: V/C>2.0
5 points: V/C≥1.5 and V/C<2.0
2 points: V/C≥1.0 and V/C<1.5
0 points: V/C≤1.0

*For projects on existing location, the higher the existing and future congestion, the more points are awarded. For new location projects, if the project were not implemented, the higher the level of congestion in parallel corridors and future congestion in parallel corridors, the more points are awarded.

Continuity and Connectivity (7 points): Improvement to route continuity and the connectivity of the overall transportation network

7 points: Project has regional significance and provides considerable benefit to the regional transportation system –OR- completes a logical element of the transportation system (i.e. fills in the gaps)
4 points: Project has multijurisdictional significance and provides benefit to a multijurisdictional area
1 points: Project has local significance (only) and provides benefit only to a localized area

*This criterion awards more points to projects that promote overall system continuity and efficiency. More points are awarded for projects that increase the efficiency of the entire system, whereas fewer points are awarded for projects that benefit an isolated area alone.

Major Users (4 points): Service to major activity centers

4 points: Project provides improvements in access to an existing regional major activity center –OR- project reduces single-occupant vehicle travel to, between, and within activity centers
2 points: Project provides improvements in access to an existing local major activity center or a future regional major activity center –OR- project reduces single-occupant vehicle travel to and within activity centers
1 point: Project provides improvements in access to a future local major activity center –OR- project reduces single-occupant vehicle within activity centers
0 points: Project does not benefit activity centers

*Multimodal projects that benefit activity centers would be awarded the highest number of points whereas projects not benefiting activity centers would be awarded the lowest number of points.

Freight Use (5 points): Substantial service to freight movement or facility servicing substantial freight movements

5 points: Project enhances the ability for a National Highway System Route, Interstate Route, or other major state or local route to efficiently move freight
3 points: Project maintains the ability for a National Highway System Route, Interstate Route, or other major state or local route to efficiently move freight
0 points: Project impairs the ability for a National Highway System Route, Interstate Route, or other major state or local route to efficiently move freight

*Projects that increase capacity, improve roadway geometry, increase average travel speed, improve access, and/or improve mobility would be awarded a higher point value. Projects that make the movement of trucks more difficult and less efficient would be awarded a lower point value.

2. Safety and Security (30 points)

Geometric Impact on Existing Roadways (18 points): Improvement to geometric deficiencies such as horizontal and vertical alignment, lane width, or shoulder conditions

18 points: Project corrects all existing geometric roadway deficiencies
15 points: Project corrects 80% of existing geometric roadway deficiencies
12 points: Project corrects 65% of existing geometric roadway deficiencies
9 points: Project corrects 50% of existing geometric roadway deficiencies
6 points: Project corrects 35% of existing roadway geometric deficiencies
3 points: Project corrects 20% of existing geometric roadway deficiencies
0 points: Project does not correct any existing roadway geometric deficiencies

*Projects that mitigate inadequate width roadways (not number of lanes, width of travelway), inadequate width/condition shoulders, and sharp curves or steep hills/deep valleys would be awarded the highest point values. New location roadways would be awarded points only if they replace or supplement a deficient facility that is not being improved.

Vehicle Crash Reduction (6 points): Potential to reduce crash history

6 points: Project with highest crash rate (segment rate)
3 points: Project with a mid-range crash rate (segment rate)
0 points: Project with the lowest crash rate (segment rate)

*Projects are ranked from highest to lowest and awarded a graduated point value based on ranking

Bike/Pedestrian Safety (4 points): Contributor to improved safety for pedestrians and bicyclists

4 points: Project provides positive benefit to pedestrian and bicycle safety (i.e. provides new sidewalks, bikeways, multiuse paths, trails, improved crossings, and similar)
1 point: Project will not change conditions for pedestrians or bicyclists
0 points: Project will negatively impact bicycle or pedestrian facilities and accommodation

* Projects that include improvements to the pedestrian and bicycle system that enhance safety and accommodation above existing conditions, would be awarded more points. Projects that maintain the status quo or have negative impacts would be awarded fewer points.

Homeland Security (2 points): Strategic project that improves Homeland Security

2 points: Project supports evacuation or incident management purposes
0 points: Project does not support evacuation or incident management purposes

*Projects that enhance the efficiency of key travel routes and/or services during major incidents or during evacuations would be awarded the highest point values. Projects on other routes or that do not enhance travel efficiency and system use during evacuations and/or incidents would not be awarded points.

3. Environmental Impacts (16 points)

Natural Environment (8 points): Impact on wetlands, watersheds, ecosystems, air, and water quality

8 points: Project has significant and measurable net positive impact on wetlands, watersheds, ecosystems, air, and water quality
4 points: Project is neutral in its environmental impact, neither providing significant benefit or detriment to the environment
0 points: Project has significant and net negative impact on wetlands, watersheds, ecosystems, air, and water quality

*Projects that contribute to improvements in water and air quality, restore or increase (appropriately) wetlands, and protect ecosystems would be awarded higher point values. Projects that involve significant mitigation and remediation of wetlands and impact sensitive ecosystems would be awarded lower point values.

Neighborhood (8 points): Impact on neighborhoods, communities, and historic and archaeological sites

8 points: Project has a net positive impact on neighborhood, community, historic, or archaeological elements in the community. The project is sensitive to the area context. Project has limited or no impact to significant community elements (schools, churches, archaeological sites, homes, cultural amenities, etc.) and provides measurable benefit in terms of aesthetics, safety, and accommodation of all modes of transportation.
4 points: Project is neutral in its impact on neighborhood, community, historic, or archaeological elements in the community. The project is somewhat context sensitive; however, it has some measurable and real impact to community elements (schools, churches, archaeological sites, homes, cultural amenities, etc.).
0 points: Project has a net negative impact on neighborhood, communities, and historic and archaeological sites. Project encourages unsustainable growth.

*Streetscape, bikeway, trail, sidewalk, transit, context-sensitive roadway modification, and similar projects would be awarded higher point values. Significant road widening and projects that require significant "takings" and that have substantial community impacts would be awarded lower point values.

4. Public/Community Support (8 points)

Existing Plans (4 points): Adherence to existing street and highway, master, regional, and local modal plans

4 points: Project is a part of two of the following: statewide, regional, and locally adopted plans
3 points: Project is a part of a statewide, regionally or locally adopted plan
2 points: Project is not a part of any of the aforementioned plans, but is regionally and locally supported
1 point: Project is not a part of any of the aforementioned plans, but is locally supported

*Projects programmed in local capital improvement programs, regional programs, and statewide programs and that are a part of adopted plans would be awarded the highest number of points. Projects that are not programmed or a part of adopted plans would be awarded the fewest number of points.

Community Support (4 points): Strong governmental or community support or continuity with local goals and initiatives and consistency of request by local jurisdictions

4 points: Project has strong and consistent local support (project has been identified as a high local priority on a consistent basis). Project has received funding towards design and ROW.
2 points: Project has strong, but not always consistent local support or it is a new project within the last year. Project has some funding, but is not enough to begin design work.
1 point: Project has strong local support from the jurisdiction, but is highly controversial or has not received any funding**.**

*Projects that have been a consistent priority for local jurisdictions and those that the public and public officials widely support are awarded the highest number of points. Projects that are controversial (making them hard to implement), but are supported by the local jurisdiction would be awarded fewer points.

5. Funding/Implementation Considerations (8 points)

Feasibility (3 points): Reasonable cost, efficient, resourceful, having positive long-term economic impacts

3 points: Project has demonstrated feasibility either through a concept plan or completed feasibility study, project has begun design work
2 points: Project has undergone some level of concept planning or demonstrates the ability to be implemented
1 point: Project is undefined, except by long range or comprehensive plan

*Projects that have demonstrated feasibility for implementation are awarded the highest number of points. These projects will often have had a supporting feasibility study, concept design, and engineering completed. Projects that are less well-defined are awarded fewer points.

Project Ready (4 points): Project ready to go, except for funding

4 points: Project ready to go (designed and mostly funded)
3 points: Project is well-defined (designed and partially funded)
2 points: Project is well-defined (has feasibility study), but has no funding identified
1 point: Project has funding identified, but is an expansion of an existing road
0 point: Project has no funding and is an new road

*Projects that are ready and have some or all the funding needed would be awarded higher point values. Projects that are less well-defined and do not have funding would receive fewer points.

Interagency Cooperation (1 point): Importance to other agencies or jurisdictions or related to joint initiatives involving multiple jurisdictions or agencies

1 point: Project has state or regional, as well as local support
0 points: Project has only single-agency support

*Projects of regional significance, supported by a larger contingent of jurisdictions would be awarded more points and projects with less interagency support and cooperation would be awarded fewer points.

6. Smart Growth/Mobility (8 points)

Growth Areas (4 points): Promotion of sensible, sustainable growth

4 points: Project promotes, encourages, and supports sustainable patterns of growth
1 point: Project neither promotes nor discourages sustainable patterns of growth
0 points: Project encourages unsustainable patterns of growth

*Projects that support and enhance existing stable communities and/or planned nodes of responsible growth would be awarded more points. Projects that promote or extend unsustainable patterns of development would be awarded fewer points.

Intermodal (4 points): Enhancement of intermodal access

4 points: Project is on a transit route (or provides access to regional transit), designated bike route, supports TDM, and in an area with pedestrian activity
3 points: Project is on two of: transit route, supports TDM, bike route, and in a pedestrian activity area
1 point: Project is on a bike route, transit route, supports TDM or in a pedestrian activity area
0 points: Project is not on a bike route, transit route, does not support TDM or in a pedestrian activity area

FAMPO RSTP AND CMAQ FUNDING PROJECT SELECTION AND PRIORITIZATION CRITERIA METHODOLOGY

INTRODUCTION

This document describes the process the Fredericksburg Area Metropolitan Planning Organization (FAMPO) will undertake to identify and select transportation projects for inclusion in FAMPO's Transportation Improvement Program (TIP). The selection process outlined in this document will be used for all proposed projects using Federal Regional Surface Transportation Program (RSTP) and Congestion Mitigation and Air Quality Improvements (CMAQ) program funding; beginning in Fiscal Year 2010

The process developed for selecting and prioritizing projects utilizing RSTP and CMAQ funding will include four steps: **1)** applications and preliminary screening; **2)** project evaluation; **3)** project prioritization; and **4)** project selection.

Each locality or agency's highest rated project will receive some amount of CMAQ or RSTP funding in each fiscal year unless the FAMPO Policy Committee deems the project to be a non-priority. The percentage of funding allocated to each project will be developed by the FAMPO Staff and the FAMPO Technical Committee for consideration by the FAMPO Policy Committee.

UNUSED FUNDING

CMAQ: All unused, non-pooled* CMAQ funding must revert to the FAMPO reserve, per Federal guidelines.

RSTP: Non-pooled RSTP funds that have not been obligated for more than a two year period will revert to the FAMPO reserve for reallocation. Any funds for projects which have been cancelled will be subject to reallocation. Left over funds for projects that have been completed will be subject to reallocation. There are two possible courses of action to determine the funding reallocation in these circumstances as follows:

1. The funds will be returned to the FAMPO reserve and subject to broad competition on a Regional basis in all cases.

2. If the locality is successful in leveraging additional funding from proffers, private sources, bonds, grants, etc. to supplant the original RSTP funds, then the locality will retain control of original RSTP funds in an amount equal to 50 percent of the locally-leveraged funding. The retained funds will be subject to the same two year deadline as shown in #2 above. The remainder of the

funding will be returned to the FAMPO reserve and subject to broad competition on a Regional basis.

*Note: Pooled funds are defined as funds being accumulated in a UPC account to pay for an eligible CMAQ or RSTP project.

RESERVE FUNDS FOR EMERGENCY SITUATIONS

Beginning in FY10, 10 to 15% of FAMPO's annual RSTP allocations will be placed into reserve for emergency situations, studies and cost overruns. If this allocation is not allocated within that fiscal year, the emergency funds will be the first funds allocated in the subsequent year.

Emergency situations can be characterized as any situation including natural and man made disasters that suddenly and seriously negatively effect:

- Regional Mobility for all Modes of Transportation
- Safety and Security of Users
- The Natural Environment
- Repair Costs

The locality or agency requesting emergency funds will be required to provide a 50% local match on the requested funding.

REGIONAL SURFACE TRANSPORTATION PROGRAM (RSTP)
PROJECT SELECTION

RSTP funds should be allocated and implemented in a manner consistent with the current Federal guidelines for their use (federal guidelines are available from FAMPO upon request). Starting in FY 2010, RSTP funds will be selected based on rankings across the MPO area for:

Ranking Factors:

- Safety
- Congestion Management
- Cost Effectiveness
- Project Readiness/ Additional Committed Funding for Project
- Ability to Get Project to the Next Phase
- Natural and Built Environment
- Efficient Future Land Use
- System Continuity
- Accessibility

RSTP APPLICATION PROCESS AND PRELIMINARY SCREENING

Project funding application forms will be in an electronic format (either .doc or .pdf) and will be distributed to the localities and agencies. Once the applications are received, the projects will go through an initial screening process that will check for:

- The proposed project meets all applicable criteria under Federal regulations; the Safe Accountable Flexible Efficient Transportation Equity Act – A Legacy for Users (SAFETEA-LU)
- Determination of the projects eligibility to receive funding under the Federal RSTP/CMAQ Guidelines
- The project must be consistent with FAMPO's current Long Range Transportation Plan (2035 LRTP)
- A detailed project description with supporting data
- Cost estimates for proposed projects
- A defined project implementation schedule
- A demonstration that the project is ready for the proposed phase (PE, ROW or Construction)
- A demonstration that the project management team is in place to oversee the project

RSTP PROJECT EVALUATION

After the initial screening process has been completed, projects will be placed into one of six categories, which are listed below, and then scored. Projects within each category will then be compared to each other. FAMPO Staff will evaluate all projects according to the criteria. Staff will then prepare a list of candidate projects that have been scored and ranked in each category. The projects will be listed in descending order from the highest score to lowest score in each category. A funding amount for each project will then be assigned according to the project rankings until the available funding is expended. If the project is eligible for both RSTP and CMAQ funding, the criteria in which the project was originally scored under will determine its ranking unless there are unexpended funds from the other funding category. For example; an intersection improvement project is scored under the CMAQ Criteria. The project does not score high enough in competition with the other CMAQ projects to receive funding and there is an excess of RSTP funds; the project will then be funded via the RSTP funds or vice versa. The list of projects will then be shared with the FAMPO Technical Committee for review, comment and endorsement. The project list will then be presented to the FAMPO Policy Committee for approval.

If the total list of projects exceeds the amount of total funding available, then FAMPO staff will recommend the amount of funds to be allocated to each project, for review, comment and endorsement by the Technical Committee and approval by the FAMPO Policy Committee.

Once the list is approved by the FAMPO Policy Committee, staff will work with VDOT/DRPT to include each project's funding allocations in VDOT's Six Year Improvement Program, (SYIP) which must be submitted to VDOT by June 1 of every year. Selection of projects for inclusion in FAMPO's Transportation Improvement Program (TIP) is based on policies and procedures for programming projects in the TIP (this requires consideration of federal funds obligation requirements, as described by state and federal policies).

The six categories are as follows:

1. **Roadway Capacity**
   - Widening, new facilities, interchanges/intersection improvements
   - Bridge rehabilitation projects & P/E

2. **Intelligent Transportation Systems (ITS) and Operational Improvements**
   - Corridor operational improvements (i.e. signal synchronization/ optimization, and incident management)

3. **Intermodal Transportation Projects**

4. **Transit Projects**
   - Vehicle replacement/purchases
   - Other projects/programs/equipment/signage

5. **Planning/PE Studies**

6. **Non-Motorized Projects**
   - Bicycle projects
   - Pedestrian projects

The descriptions of the evaluation criteria and methods used in scoring candidate projects are as follows:

1. ROADWAY CAPACITY PROJECTS

The FAMPO highway project prioritization methodology adopted by the FAMPO Policy Committee will be employed for ranking all highway project candidates.

2. INTELLIGENT TRANSPORTATION SYSTEMS AND OPERATIONAL IMPROVEMENTS

Criteria	Points
Will the project improve traffic flow during peak congestion periods and special circumstances?	0-25
Will the project directly reduce the number and severity of roadway incidents?	0-25
Does the project address the mobility or accessibility needs of the region?	0-10
Does the project increase the linkage and communications among various operating agencies to provide better traffic information to the motorists?	0-20
Is the project/project concept part of the Regional ITS Strategic Plan?	0-10
Additional committed funding (on a sliding scale: project brining most funds – 10 points, least funds - 0 points)	0-10

3. INTERMODAL TRANSPORTATION PROJECTS

Criteria	Points
Will the project establish opportunities for linkages or connections between transportation modes or existing corridors and industrial, employment and population centers?	0-40
Will the project improve the operating system to better accommodate intermodal movements?	0-20
Will the project improve rail or vehicular access to freight distribution facilities, ports, major industrial clients, or employment and population centers?	0-20
Project readiness: projects with detailed design and cost estimates that are ready to go = 10 points Projects with additional committed funding = 10 (sliding scale)	0-20

4. TRANSIT PROJECTS

Vehicle Replacement/ New Vehicle Acquisitions

With respect to vehicle replacements, the evaluators should assign a score from 0-100 based on "consideration" of the following factors:

Evaluation Criteria	Points	Scoring Instructions/ Supporting Data
Vehicles to be replaced have reached end of usefulness (defined by FTA)	0-20	List of buses to be replaced with existing/projected mileage and age
Estimated cost per vehicle	0-20	Estimated price per fully equipped vehicle
Number of passenger trips effected	0-20	System ridership for past full year/ additional projected ridership
Pollution reduction and energy efficiency enhancements	0-20	Are new vehicles more energy efficient and promote green technologies
Other available funding sources	0-20	Other potential funding sources: likelihood of funding, local match requirement, grant cycle.

Evaluators should consider all of these factors when scoring the application and enter brief comments about each of them on the evaluation sheet.

Other Transit Projects: Facilities/Equipment/Signage

With respect to new or expanded transit services, the evaluators should assign a score from 0-100 based on "consideration" of the following factors:

Evaluation Criteria	Points	Scoring Instructions/ Supporting Data
Population within service area and prospective ridership within area (within ¾ mile of transit route)	0-20	Preliminary service routing, population estimate within service area, (based on most recent census) estimate of perspective ridership
Estimated service cost	0-20	Cost per hour of service, revenue hours of service, cost of buses utilized in service
Will proposed service operate in an area with significant traffic congestion	0-30	Highway LOS of D or below
Will the service attract "choice" or SOV riders and/or transit dependent populations	0-10	Median Household income above and below poverty levels by Census Block Group from most recent US Census
Other funding sources	0-10	Other potential funding sources: likelihood of funding, local match requirement, grant cycle.
Will the jurisdiction commit to continuing the service if the it meets defined ridership objectives	0-10	Letter of Commitment from jurisdiction

Evaluators should consider all of these factors when scoring the application and enter brief comments about each of them on the evaluation sheet.

5. PLANNING/PE STUDIES

Criteria	Points	Yes/No
Is the study necessary to address a major issue or to revise the LRTP?	0-10	
Is the study necessary to address a safety issue?	0-20	
Is the study concerned with encouraging multimodal transportation?	0-10	
Does the study address the region's mobility or accessibility needs?	0-20	
Is the study well defined in terms of purpose, design concept and scope?	0-5	
Do the study's goals and objectives show support for economic vitality, quality of life and efficient, compact land use patterns? (5 points each)?	0-15	
Do the goals/objectives foster environmental preservation/protection?	0-10	
Projects with additional committed funding (sliding scale)	0-10	

6. BICYCLE/PEDESTRIAN PROJECTS

A. Number of people the project will benefit (0-20 points)

These projects will be evaluated based on estimated users that are within a logical distance from the project. A three-mile radius will be used for bicycle projects and a one-mile radius for pedestrian projects. FAMPO 2006 Traffic Analysis Zone (TAZ) geography will be used to determine the base year and projected year (2035) population and employment.

The highest user base will receive 20 points and the lowest user base will receive 0 points.

B. Projects will address existing needs (0-40 points)

Criteria	Points	Scoring Instructions
Need for Improvements	0-10	Completion of a missing link as part of phased construction
	0-10	Provides access to transit, commercial/employment centers, recreational facilities from residential areas
	0-10	Eliminates a barrier to major destinations
	0-10	Improves bicycle/pedestrian safety

C. Transportation Function (0-20 points)

Criteria	Points	Scoring Instructions
Transportation Function	0-10	Serves trips to work/school
	0-10	Serves other trips (personal business, shopping, recreation, etc.)

D. Matching Funds (0-10 points)

Projects with additional committed funding (i.e. an approved budget, resolution, proffer, impact fee, etc) will be listed on a sliding scale, with the project pledging the most additional money receiving 10 points and the least receiving 0 points.

E. Project Readiness (0-10 points)

Projects with detailed design and cost estimates that are ready to go will receive 10 points

CONGESTION MITIGATION & AIR QUALITY IMPROVEMENT PROGRAM (CMAQ) PROJECT SELECTION

Starting in FY 2010, Congestion Mitigation & Air Quality Improvement Program (CMAQ) funds will be selected based on rankings across the MPO area for:

RANKING FACTORS:

- Project readiness/Additional committed funding
- Ability to get project to the next phase
- Demonstrated increase to safety in and around project location
- Demonstration that the project will alleviate congestion in and around the project area
- Demonstration that the project will promote efficient land use
- A demonstration that the projects improve air quality

CMAQ APPLICATION PROCESS AND PRELIMINARY SCREENING

Project funding application forms will be in an electronic format (either .doc or .pdf) and will be distributed to the localities and agencies. Once the applications are received, the projects will go through an initial screening process that will check for:

- The proposed project meets all applicable criteria under Federal regulations; the Safe Accountable Flexible Efficient Transportation Equity Act – A Legacy for Users (SAFETEA-LU)
- Determination of the projects eligibility to receive funding under the Federal RSTP/CMAQ Guidelines
- The project must be consistent with FAMPO's current Long Range Transportation Plan (2035 LRTP)
- A detailed project description with supporting data
- Cost estimates for proposed projects
- A defined project implementation schedule and project management strategy (i.e. managed by locality, VDOT, etc.)
- A demonstration that the project is ready for the proposed phase (PE, ROW or Construction)

EMISSIONS REDUCTION ANALYSIS OF ELIGIBLE PROJECTS

After the initial screening has been completed, FAMPO staff, with assistance from VDOT, local governments and agencies will conduct an emissions reduction analysis on all eligible projects. Emissions are estimated for volatile organic compounds (VOC) and nitrogen oxides (NOx). The results of the analyses will be tabulated for the eligible projects.

CMAQ PROJECT EVALUATION

After the initial screening process has been completed, projects will be placed into one of five categories, which are listed below, and then scored. Projects within each category will then be compared to each other. FAMPO Staff will evaluate all projects according to the criteria. Staff will then prepare a list of candidate projects that have been scored and ranked in each category. The projects will be listed in descending order from the highest score to lowest score in each category. A funding amount for each project will then be assigned according to the project rankings until the available funding is expended. If the project is eligible for both RSTP and CMAQ funding, the criteria in which the project was originally scored under will determine its ranking unless there are unexpended funds from the other funding category. For example; an intersection improvement project is scored under the CMAQ Criteria. The project does not score high enough in competition with the other CMAQ projects to receive funding and there is an excess of RSTP funds; the project will then be funded via the RSTP funds or vice versa. The list of projects will then be shared with the FAMPO Technical Committee for review, comment and endorsement. The project list will then be presented to the FAMPO Policy Committee for approval.

If the total list of projects exceeds the amount of total funding available, then FAMPO staff will recommend the amount of funds to be allocated to each project, for review, comment and endorsement by the Technical Committee and approval by the FAMPO Policy Committee.

Once the list is approved by the FAMPO Board, staff will work with VDOT/DRPT to include each project's funding allocations in VDOT's Six Year Improvement Program, (SYIP) which must be submitted to VDOT by June 1 of every year. Selection of projects for inclusion in FAMPO's Transportation Improvement Program (TIP) is based on policies and procedures for programming projects in the TIP (this requires consideration of federal funds obligation requirements, as described by state and federal policies).

CMAQ projects will be divided into five primary groups:

- Roadway Projects
- Non-Roadway Projects (Transit, TDM and Bicycle /Pedestrian)
- ITS Projects
- Engineering and Design
- Other Projects

ROADWAY PROJECTS

Eligible highway projects include improvements to intersection/interchange geometric design..

Scoring Factors for Roadway Projects:

Criteria	Points	Scoring Instructions
Reduction of Congestion	0-20	Greatest positive change to LOS = 20 Lowest positive change to LOS = 0 (2 point sliding scale)
Air Quality	0-30	Reduces NOx = 15 points Reduces VOC = 15 points
Safety	0-20	20 points to the project with the highest safety improvements Straight line interpolation (relative scale)
Project Readiness	0-20	Projects with detailed design and cost estimates that are ready to undertaken = 10 points Projects with additional funding committed = 10 points (sliding scale of 2 points each)
Efficient Land Use	0-10	Will the project provide access to areas of efficient, compact land use?

Isolated Intersection Projects

This project type refers to improvements at individual intersections that are not part of a coordinated signal system. The projects may include improvements in the geometric design of the intersection and signal timing or improvements in timing only. The change in emissions for a project is based on the change in delay (in hours per day) at the intersection as a result of the project.

INTELLIGENT TRANSPORTATION SYSTEMS (ITS) AND OPERATIONAL IMPROVEMENTS

A wide array of highway and transit projects are classified as ITS/Operational projects, such as:

- Traffic signal timing
- Upgrades to traffic signal systems
- Advanced traffic management systems
- Changeable message signs
- Communications improvements
- Video surveillance infrastructure
- Automatic vehicle location and passenger counting for transit purposes

Coordinated Signal Systems

This type of project includes several intersections along a section of roadway for which the signal timing is coordinated to promote progression of traffic along that section. Most of the projects in this category consist of improvements to signal timing only. The change in emissions for a project is based on the change in average speed (in miles per hour) along the section of roadway as a result of the project.

The emissions factors are determined for the “before” and “after” average speeds. These factors are multiplied by the daily VMT (vehicle miles traveled) for the section of roadway to compute the daily change in emissions of VOC and NO_x for the section in units of kilograms per day.

Citywide and Countywide Signal System Improvements

This type of project includes a large number of intersections within a jurisdiction. Nearly all of the intersections included in this type of project are part of a coordinated traffic signal system. The projects in this category include improvements to signal equipment and signal timing. The change in emissions for a project is based on the change in average speed (in miles per hour) for the citywide/countywide system.

Improvements may include lane additions, which would permit a change in the traffic signal phasing. For instance, at an intersection with a long cycle length, the addition of left turn lanes would allow the opposing lefts to move concurrently, followed by the opposing through movements. The effect would eliminate phasing referred to as "split phasing" and reduce the overall cycle length of the intersection in a coordinated signal system.

To analyze these projects, citywide or countywide values for average speed and VMT for principal and minor arterials are obtained from a VDOT Conformity Analysis. Then, using the analysis discussed in the section on coordinated signal systems, a four miles-per-hour increase in average speed is assumed to result from the project. If the applicant submits additional "before" and "after" data and analysis, the staff will use this data in lieu of the above value estimated for this category.

The emissions factors are determined for the "before" and "after" average speeds. These factors are multiplied by the citywide daily VMT to compute the daily change in emissions of VOC and NOx in units of kilograms per day.

These projects take advantage of new technologies aimed at improving traffic flow, reducing response time to traffic incidents, improving safety, and providing timely information to the traveling public.

The scoring factors for ITS projects are as follows:

Criteria	Points
Will the project improve traffic flow during peak congestion periods and special circumstances?	0-25
Will the project directly reduce the number and severity of roadway incidents?	0-25
Does the project address the mobility or accessibility needs of the region?	0-10
Does the project increase the linkage and communications among various operating agencies to provide better traffic information to the motorists?	0-20
Is the project part of the Regional ITS Strategic Plan?	0-10
Additional committed funding (2 point sliding scale)	0-10

NON-ROADWAY PROJECTS

Transit Programs and Projects

Transit projects include replacement buses, and new/expanded transit services or facilities. Emissions benefits for most transit projects are based on the predicted reduction in automobile trips and VMT resulting from the project. Projects that involve new or expanded service also take into account the increase in emissions due to the operation of the new transit vehicles. Park & ride lot projects take into account the emissions due to the automobile trips to the lot. Emissions reductions resulting from replacement buses are due to emissions improvements in the newer bus engines and any increase in ridership due to newer vehicles.

The scoring factors for Bus Replacements are as follows:

With respect to vehicle replacements, the evaluators should assign a score from 0-100 based on "consideration" of the following factors:

Evaluation Criteria	Points	Scoring Instructions/ Supporting Data
Vehicles to be replaced have reached end of usefulness (defined by FTA)	0-20	List of buses to be replaced with existing/projected mileage and age
Estimated cost per vehicle	0-20	Estimated price per fully equipped vehicle
Number of passenger trips effected	0-25	System ridership for past full year/ additional projected ridership
Pollution reduction and energy efficiency enhancements	0-25	Are new vehicles more energy efficient and promote green technologies
Other available funding sources	0-10	Other potential funding sources: likelihood of funding, local match requirement, grant cycle.

Evaluators should consider all of these factors when scoring the application and enter brief comments about each of them on the evaluation sheet.

The scoring factors for New/Expanded Transit/ Service Projects are as follows:

With respect to new or expanded transit services, the evaluators should assign a score from 0-100 based on "consideration" of the following factors:

Evaluation Criteria	Points	Scoring Instructions/ Supporting Data
Population within service area and prospective ridership within area (within ¾ mile of transit route)	0-30	Preliminary service routing, population estimate within service area, (based on most recent census) estimate of perspective ridership
Estimated service cost	0-10	Cost per hour of service, revenue hours of service, cost of buses utilized in service
Will proposed service operate in an area with significant traffic congestion	0-30	Highway LOS of D or below
Will the service attract "choice" or SOV riders	0-10	Median Household income by Census Block Group from most recent US Census
Other funding sources	0-10	Other potential funding sources: likelihood of funding, local match requirement, grant cycle.
Will the jurisdiction commit to continuing the service if the it meets defined ridership objectives	0-10	Letter of Commitment from jurisdiction

Evaluators should consider all of these factors when scoring the application and enter brief comments about each of them on the evaluation sheet.

TDM Programs

Transportation Demand Management (TDM) – GWRideConnect

GWRideConnect, the Regional Transportation Demand Management Agency, serves the residents of Stafford, Spotsylvania, Caroline and King George counties and the City of Fredericksburg. *GWRideConnect* promotes and facilitates ridesharing and transportation demand management initiatives to assist persons seeking transportation options to their workplaces and other destinations. The overarching policy of the *GWRideConnect* Program is to promote, plan and establish transportation alternatives to the use of the single occupant vehicle, thereby improving air quality, reducing congestion and improving the overall quality of life for the citizens of the region.

The activities and programs of a transportation demand management agency are all CMAQ eligible, are Regional in scope and provide air quality and congestion mitigation benefits across the entire FAMPO service area. Starting with FY 2010 allocation year, a base amount of $125,000 of the yearly CMAQ allocation will be set aside for *GWRideConnect*. The *GWRideConnect* agency will submit project applications and corresponding materials for programs and activities each fiscal year. Any unspent portion of the yearly allocation will be returned back to FAMPO and placed into the CMAQ reserve balance for reallocation in the following fiscal year. The funding will be reviewed annually and funding will be derived from an off the top designation of the region's annual allocation of CMAQ funds. If

GWRideConnect requires funds in excess of the base allocation, normal CMAQ procedures will be followed.

Bicycle and Pedestrian Projects

Air quality benefits of bicycle and pedestrian projects are calculated as a function of a reduction in the number of automobile trips and VMT. Analysis methods for bicycle and pedestrian projects are typically project specific and may be qualitative or quantitative depending on the type of project and the availability of input data. The scoring criterion that is used for bicycle and pedestrian projects under RSTP funding will be used to score the CMAQ funding requests with additional consideration given to the projects air quality benefits.

OTHER PROJECTS

The other project category includes those projects that do not fit perfectly into any other project groupings. Analysis methods for these projects are typically project specific and may be qualitative or quantitative depending on the type of project and the availability of input data. These projects will be addressed on a case by cases basis by FAMPO Staff and the FAMPO Technical Committee.

North Carolina DOT
(NCDOT)

Highway Prioritization Model Overview

Total Score per Highway Project = Quantitative Score + Qualitative Score

- **Quantitative** score derived from current roadway condition data:
  - Safety Score (Critical Crash Rate, Crash Severity, Crash Density)
  - Mobility/Congestion Score (Volume/Capacity + AADT)
  - Infrastructure Health/Pavement Score (Pavement Condition Rating)

- **Qualitative** score driven by Division rank and Local rank:
  - MPO/RPO Rank – use local methodology to rank order priorities
  - Division Rank – use knowledge of local area to rank order priorities
  - ***Only one # 1 highway project per MPO/RPO and per Division***
    - ◊ ***Rank Top 25 highway projects***

Prioritization Model Matrix for Scoring Highway Projects

		Quantitative	Qualitative	
GOAL	**TIER**	**Weighted Condition Data Percentage**	**Weighted Division Rank Percentage** *Top 25 Projects*	**Weighted Local Rank Percentage** *Top 25 Projects*
MOBILITY	Statewide	70%	20%	10%
	Regional	50%	25%	25%
	Subregional	0%	50%	50%
SAFETY	Statewide	70%	20%	10%
	Regional	70%	15%	15%
	Subregional	0%	50%	50%
INFRASTRUCTURE HEALTH	Statewide	70%	20%	10%
	Regional	70%	15%	15%
	Subregional	0%	50%	50%

Prioritization Model Matrix for Scoring Highway Projects

		Quantitative		Qualitative	
GOAL	**TIER**	**Weighted Condition Data Percentage**		**Weighted Division Rank Percentage** *Top 25 Projects*	**Weighted Local Rank Percentage** *Top 25 Projects*
MOBILITY	Statewide	70%	**CONG = 80% PVMT = 10% SAFE = 10%**	20%	10%
	Regional	50%		25%	25%
	Subregional	0%		50%	50%
SAFETY	Statewide	70%	**CONG = 10% SAFE = 80% PVMT = 10%**	20%	10%
	Regional	70%		15%	15%
	Subregional	0%		50%	50%
INFRASTRUCTURE HEALTH	Statewide	70%	**CONG = 10% SAFE = 10% PVMT = 80%**	20%	10%
	Regional	70%		15%	15%
	Subregional	0%		50%	50%

Quantitative Score

- ALL Condition Data is derived from NCDOT Sources
- *Rule of Thumb*: HIGHER the Score the WORSE the condition

TOTAL QUANTITATIVE SCORE = 100+ points

- ***Congestion Score (0 to 100+)***
  - Score = Volume/Capacity Ratio (60%) + AADT (40%)
    - V/C = (AADT/Capacity)*100
    - AADT = AADT/1000

- ***Safety Score (0 to 100)***
  - Score = mathematical combination of Density (33%) + Severity(33%) + Critical Crash Rate(33%)
    - Crash Density – The crash density of the study area versus the average crash density of similar facilities
    - Severity Index – measure of the mix of accident severity in a group of accidents at a location
    - Critical Crash Rate – The actual crash rate versus the critical crash rate for the study area

- ***Pavement Condition Score (0 to 100)***
  - Score = 100 - Pavement Condition Rating

Examples of Quantitative Scoring

- Apply Highway Matrix Weights and Percentages

- For Statewide Tier Mobility Project (major widening):
  - (0.8 x Congestion Score) + (0.1 x Pavement Score) + (0.1 x Safety Score)
  - Multiply result X weight by Tier (i.e., 70 %)

- For Regional Tier Infrastructure Health Project (rehabilitation):
  - (0.1 x Congestion Score) + (0.8 x Pavement Score) + (0.1 x Safety Score)
  - Multiply result X weight by Tier (i.e., 70 %)

- Total Quantitative Score is always weighted by tier and goal (i.e., 70 or 50 percent) to obtain total quantitative points/per project

Qualitative Point System

Division Rank *TOP 25*	Points		**Local (MPO/RPO) Rank** *TOP 25*	Points
1	100		1	100
2	96		2	96
3	92		3	92
4	88		4	88
5	84		5	84
6	80		6	80
7	76		7	76
--	--		--	--
--	--		--	--
25	4		25	4

Examples of Qualitative Scoring

Qualitative Scoring Summary:

- For Statewide Tier Mobility Project (major widening):
  - (0.2 x Division Rank Points) + (0.1 x Local Rank Points)

- For Regional Tier Infrastructure Health Project (rehabilitation):
  - (0.15 x Division Rank Points) + (0.15 x Local Rank Points)

Summary for Scoring Highway Projects

- ***OVERALL SCORE IS Quantitative plus Qualitative points***

- **Years 1-5 STIP projects** are considered ***Committed*** Delivery Projects & therefore do not need to be ranked (and will not be pre-populated in the database).

- **Years 6-10 of STIP projects** are considered ***Planning*** Projects, i.e. projects in a developmental stage that could ultimately move into the 5-year Committed schedule & therefore do need to be ranked (and will be pre-populated in the database).

- The SPOT Prioritization Model **will only generate on overall rank for**:
  - Current Highway (I, R, U type) projects in STIP (years 6 & 7) AND
  - New Highway (I, R, U type) projects (needed within the next 10 years) submitted in template

Atlanta Regional Commission
(ARC)

APPENDIX G

Envision6 Project Prioritization Technical Analysis

Section 1.0 Context

In August 2006 the ARC Board adopted a Federal Funding Decisions Framework to prioritize projects for federal transportation funding. This framework incorporates the Governor's Congestion Mitigation Task Force (CMTF) recommendation to implement a project selection process that weights congestion mitigation at 70 percent as well as ARC Board direction to develop a multimodal plan that supports the region's development policies through improved integration of transportation and land use planning.

A range of technical analysis methods were developed to evaluate system expansion projects. The technical analysis reflects the 70 percent congestion criteria prescribed by the CMTF and the ARC Board guidance through the inclusion of four major components. These components estimate how well each project meets regional goals and objectives through an analysis of:

1. Recurring delay (50%) which occurs as routine traffic volumes exceed available roadway capacity or transit user benefits,
2. Non-recurring delay (20%) which occurs as a result of a traffic incidents,
3. Environmental impact (15%) which measures a project's proximity to six environmentally sensitive area types, and
4. Regional Development Plan policy support (15%) which measures the level a project supports ARC's RDP policies based on project location and scope.

Different techniques were utilized to evaluate the congestion relief benefits of highway and transit projects. This distinction reflects the fact that there is no one specific analysis tool than can be used to accurately evaluate the congestion impacts

of both highway and transit projects.

Only system expansion projects were subject to this specific technical analysis. Other technical analyses were conducted through the Congestion Mitigation Task Force to evaluate the benefits of other project types. The projects within the system expansion category met the following criteria for testing:

1. System expansion projects in current Mobility 2030 RTP
2. Construction planned in long-range (2012 and later)
3. Within the MPO boundary
4. On the Regional Strategic Transportation System
5. Federal funding programmed

These criteria were applied at the beginning of Envision6 Project Prioritization in October 2006 based on existing costs and phasing within the Mobility 2030 RTP and FY 2006-2011 TIP. Changes were made to costs and new projects were included in the analysis based on updated schedules from GDOT in January 2007. Additional changes were made to reflect input on 100% locally funded projects from jurisdiction meetings held in January and February.

In total the application of these criteria in January/February 2007 resulted in:

- **205** individual general purpose capacity project phases grouped to result in a total of **157** unique projects subject to the technical analysis. Individual projects were grouped together primarily in cases where: projects with overlapping limits, adjacent segments/phases of a larger project or separate bridge or interchange improvements that support a larger widening project.
- **29** tested managed lane projects. All managed lane projects were tested as traditional HOV lanes, including those within the 06-11 TIP.
- **17** transit capital projects within Mobility 2030 RTP were grouped into **12** unique project tests. All transit capital projects were tested including those within the 06-11 TIP.

The projects were tested as they were coded within the Mobility 2030 RTP/FY 2006-2011 travel demand model used to establish the April 2006 conformity determination.

The project scores do not reflect any new project scope details identified for inclusion in the constrained *Envision6 RTP*.

Limitations of the technical analysis methodology resulted in **20** stand alone interchange or bridge capacity/grade separation projects not being analyzed. These projects met all the criteria listed above, but because they did not include a specific increase in system capacity that would impact network performance, they were not tested.

Due to project delays or scope changes, there are **11** general purpose capacity projects with construction in long range in the draft *Envision6* constrained project list that were not tested.

These general purpose capacity projects are:

1. CL-064 & HE-136 – US 23 from SR 138 to I-675
2. DK-327A & RO-235A – Sigman Road Extension/Hayden Quarry Road from Turner Hill Road to I-20 at Sigman Road
3. FT-306C – SR 306 from SR 369 to SR 53
4. GW-316 – Hillcrest Road/Satellite Boulevard Connector
5. HE-126A1 – Hampton-Locust Grove Road from SR 20 to SR 155
6. NE-007 – US 278 from Covington Bypass to SR 142
7. PA-015 – Bill Carruth Parkway from Nebo Road to Dallas-Nebo Road
8. PA-061B – SR 61 from Nebo Road to Dallas-Nebo Road
9. RO-214 – Old Covington Highway from Lake Capri Road to Sigman Road

There are **61** long range general purpose or interchange capacity projects without federal funding that were not included in the analysis. Truck only lanes on I-75 North were also not tested.

There are **98** general purpose roadway capacity, **5** interchange capacity and **14** bridge capacity projects in the draft 2008-2013 TIP that were not tested. These projects meet all the criteria except criterion #2.

Refer to Exhibit A, B & C at the end of this document for scoring results of all the Mobility 2030 projects analyzed for this process.

Section 2.0 Congestion Scoring

As specified through the CMTF, 70% of project scoring is dedicated to congestion relief. Congestion relief includes both recurring and non-recurring (incident) congestion and is calculated differently for highway versus transit projects.

Section 2.1 Recurring Congestion - Roadway

The 2005/2006 Congestion Management Process (CMP) uses a post-processing travel demand model script to calculate link-based daily congested hours, total vehicle delay, free-flow travel time and congested travel time on the 2005 and 2030 loaded networks. The link-based data is aggregated by congestion management network facility name to calculate the three dimensional congestion measures. The composite congestion ranking for each facility is based on the sum of the points from each of the three dimensions for each facility. The maximum total score for a CMP facility is 18.

The project prioritization methodology uses the same three dimensions of congestion (intensity, duration, extent) as is used in the CMP, however the measures representing the three dimensions are slightly different as is the ranking scheme. The benefit of each project in terms of congestion relief is determined through evaluation of the assigned model network at a corridor level.

Table 1 – Project Corridor Analysis

Project Type	Corridor Analysis
Roadway Capacity	.5 mile buffer
New Interchange	1 mile + next upstream and downstream interchange
New Alignment/Bypass	1 mile + alternate state highway or major arterial route

A post-processing travel demand model script is used to compare network performance of the 2030 build scenario to a 2030 build minus the specific project under consideration. The level of benefit at the corridor level is then assigned a point value of 0-17 across each measure.

Table 2 – CMP versus Project Prioritization Evaluation Measures

Measure	Congestion Management Process	Envision6 Project Prioritization
Intensity	CMP facility maximum travel time index	Project corridor maximum peak period delay
Duration	CMP facility congested hours	Project corridor congested hours
Extent	CMP facility % of total daily system vehicle delay	Project corridor daily vehicle delay

Intensity

Project Corridor Peak Period Delay =
Sum(corridor link max congested travel time) – Sum(corridor link free flow travel time)

Using the travel time index to measure project corridor level congestion relief benefits yields marginal results. Utilizing the two components of the travel time index (congested travel time and free flow travel time) individually shows more measurable results. In the project prioritization methodology, intensity is the difference between the maximum congested travel time by link by direction within either the AM or PM peak periods and the free flow travel time. Free flow travel speeds are calculated in the model based on a lookup table of facility type and area type. The measure represents the total link level delay the project corridor experiences during the most congested period of the day.

The percent change in corridor delay between the no build and build is then assigned a ranking from 0-17 based on its % ranking within the list of prioritized projects.

Duration

Project Corridor Congested Hours (weighted by Distance) =
Sum(corridor link congested hours*link distance) / Sum(total corridor distance)

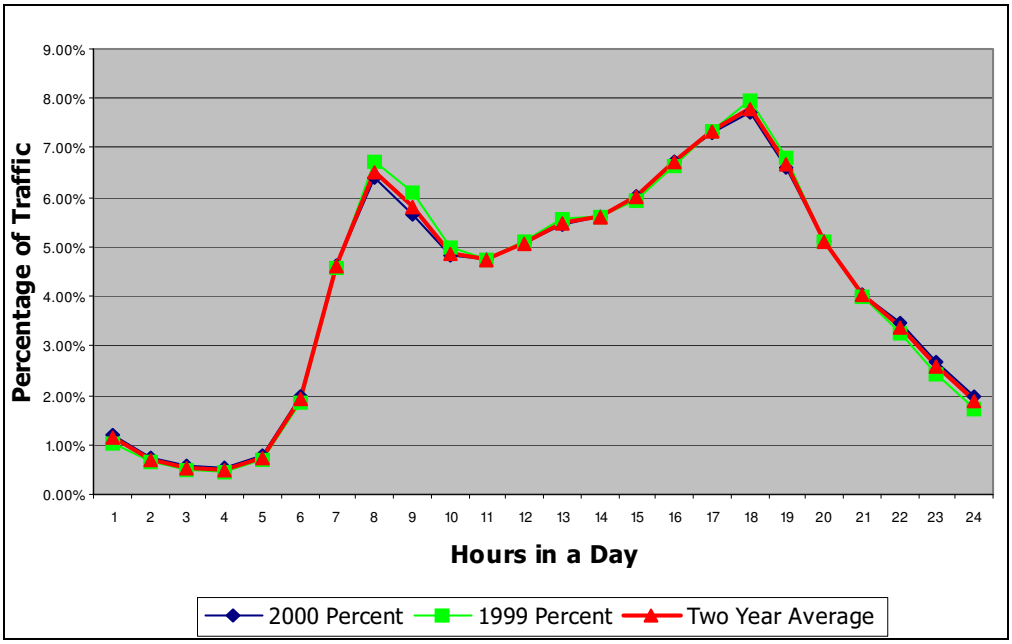
The measure uses the diurnal distribution curve within the regional trip assignment model. This curve represents the average of 1999 and 2000 daily traffic counts used

to determine the temporal trip distribution model for the four time-of-day period assignments. These counts result in hourly estimates of percent of total daily traffic. The duration of extent measure takes the total daily volume on a link and estimates the volume by hour based on the curve.

Table 3 – Diurnal Distribution of Travel in the 13-County Non-attainment Area

Hours	2000 Sum	**2000 Percent**	1999 Total	**1999 Percent**	Two Year Total	**Two Year Average**
1	879,264	**1.19%**	437,089	**1.05%**	1,316,353	**1.14%**
2	547,592	**0.74%**	273,937	**0.66%**	821,529	**0.71%**
3	414,669	**0.56%**	207,875	**0.50%**	622,544	**0.54%**
4	392,431	**0.53%**	197,378	**0.47%**	589,809	**0.51%**
5	579,587	**0.78%**	295,021	**0.71%**	874,608	**0.76%**
6	1,477,073	**2.00%**	776,739	**1.86%**	2,253,812	**1.95%**
7	3,411,341	**4.62%**	1,924,335	**4.60%**	5,335,676	**4.61%**
8	4,736,415	**6.41%**	2,821,324	**6.75%**	7,557,739	**6.53%**
9	4,184,413	**5.67%**	2,554,113	**6.11%**	6,738,526	**5.83%**
10	3,575,173	**4.84%**	2,082,742	**4.98%**	5,657,915	**4.89%**
11	3,514,627	**4.76%**	1,982,420	**4.74%**	5,497,047	**4.75%**
12	3,751,041	**5.08%**	2,134,509	**5.10%**	5,885,550	**5.09%**
13	4,015,302	**5.44%**	2,333,612	**5.58%**	6,348,914	**5.49%**
14	4,134,124	**5.60%**	2,346,228	**5.61%**	6,480,352	**5.60%**
15	4,459,875	**6.04%**	2,488,118	**5.95%**	6,947,993	**6.01%**
16	4,981,794	**6.75%**	2,779,436	**6.65%**	7,761,230	**6.71%**
17	5,405,297	**7.32%**	3,070,729	**7.34%**	8,476,026	**7.33%**
18	5,708,954	**7.73%**	3,330,786	**7.97%**	9,039,740	**7.82%**
19	4,889,228	**6.62%**	2,843,429	**6.80%**	7,732,657	**6.69%**
20	3,778,137	**5.12%**	2,148,166	**5.14%**	5,926,303	**5.12%**
21	3,001,753	**4.06%**	1,667,545	**3.99%**	4,669,298	**4.04%**
22	2,563,461	**3.47%**	1,367,698	**3.27%**	3,931,159	**3.40%**
23	1,990,215	**2.70%**	1,020,471	**2.44%**	3,010,686	**2.60%**
24	1,453,605	**1.97%**	732,662	**1.75%**	2,186,267	**1.89%**
Total	73,845,371	**100.00%**	41,816,362	**100.00%**	115,661,733	**100.00%**

Figure 1 – Diurnal Distribution of Travel in the 13-County Non-attainment Area



The duration measure uses the same V/C thresholds to define congestion as is used in the Congestion Management Process.

Table 4 – Hourly V/C Congestion Thresholds

Area Type	Freeways		Regional Strategic Arterial System	Other Arterials and Regionally Significant Roadways
	HOV	Other		
Volume to Capacity Ratio (V/C)				
URBAN	0.90	0.90	0.85	0.85
SUBURBAN	0.90	0.90	0.85	0.80
EXURBAN/RURAL	0.90	0.90	0.85	0.80

Each hour that the volume to capacity ratio exceeds the V/C ratio threshold is reported as an hour of congestion. The hours of congestion for the entire corridor is weighted by total link distance to report a single corridor hours of congestion. The measure represents the average total hours during the day that a facility exhibits congested conditions.

The percent change in corridor congested hours between the no build and build is then assigned a ranking from 0-17 based on its % ranking within the list of prioritized projects.

Extent

Project Corridor Vehicle Delay = Sum(link Total Vehicle Delay)

The CMP uses link level percentage of system total daily vehicle delay as the measure of extent for each facility. Within project prioritization, the interest is the reduction in total vehicle delay across the project corridor. The measure represents the total daily delay experienced by all vehicles using the project corridor.

The absolute change in daily vehicle delay between the no build and build scenario for each project corridor is assigned a ranking from 0-17 based on its % ranking within the list of prioritized projects. Absolute change is used in order to reflect the higher level of benefit in terms of vehicle delay reduction in the highest travel volume project corridors.

Composite Congestion Relief Measure

The composite congestion relief ranking is based on the sum of the total points across the intensity, duration and extent measures. The rankings for each measure assign 0-17 points per measure based on the projects percent rank within the entire project list for a total possible maximum of 51 points for a project (50pts cannot be split evenly by 3, so each category has a max of 17pts, for a possible total of 51pts). This represents 50 of the possible 70 points for congestion relief, with the other 20 dedicated to project level incident congestion reduction.

Section 2.2 User Benefits - Transit

The FTA's SUMMIT software was used to perform the user benefits analysis for the prioritization of transit projects. The calculation of SUMMIT User Benefits is based on the microeconomic theory of consumer surplus and the user benefits are expressed in hours (see Calculation of User Benefits, below). The SUMMIT software used inputs from the regional travel demand model and was ran via a post-processing TP+ script.

SUMMIT calculates the generalized cost of all trips in both the "Baseline Scenario" and the "Alternative Scenario" and then calculates the User Benefit Hours to be provided by the alternative scenario.

Section 2.2.1 Definition of the Transit Alternative Scenarios

Twelve (12) transit projects were identified for prioritization and an "Alternative Scenario" was created for each transit project. The modeled 2030 Highway Network from the Mobility 2030 Regional Transportation Plan (Mobility 2030 RTP) was used as the 'Baseline Scenario" for the User Benefit Analysis. Each Alternative Scenario was created by removing the particular transit project being considered, and any redundant transit feeder routes, from a copy of the modeled 2030 Highway Network. Each Alternative Scenario therefore had less transit services than the Baseline Scenario.

Section 2.2.2 Running SUMMIT: The TP+ Post Processor

The inputs from the Baseline Scenario required by the SUMMIT software already existed from the 20-County 2030 model run that was prepared and ran for the Mobility 2030 RTP. A TP+ script was used to create the inputs from the Alternative Scenario required by SUMMIT and to run the SUMMIT software. The script created new transit skims from the Alternative Scenario transit network, and then ran the Mode Choice for the Alternative Scenario using the new transit skims but reusing the person trips ad the highway skims from the Baseline Scenario. The TP+ script then ran the SUMMIT software which used the outputs from the Mode Choice of the Baseline and Alternative Scenarios to calculate the User Benefit Hours.

Section 2.2.3 Output from SUMMIT: User Benefit Hours

The SUMMIT software produced several outputs, including but not limited to: number of person and transit trips in the Baseline Scenario; change in person and transit trips resulting from the Alternative Scenario; and the transportation system User Benefit Hours that resulted from the Alternative Scenario. Since each Alternative Scenarios provided less transit services than the Baseline Scenario, the resulting User Benefit Hours calculated by the SUMMIT software were negative – implying a disbenefit, or a reduction in the transportation system's User Benefits. The results can be interpreted

as follows: The transit project, and related feeder routes, that produced the greatest user disbenefit when removed from the Baseline Scenario, would therefore provide the greatest user benefit if added to the regional transportation system.

Section 2.2.4 Ranking and Scoring the Transit Projects

The absolute value of each project's User Benefit Hours total was translated to a final score ranging from 0 to 50 based on a uniform distribution. Specifically, each project was assigned a score of 0, 10, 20, 30, 40, or 50 based on the percent rank of the User Benefit Hours total, with each of these six possible scores assigned to an equal number of projects. (Since a total of 12 transit capital projects were considered, each possible score was assigned to two projects.) The uniform distribution was used to ensure the full utilization of the possible range of scores and to avoid a concentration of scores around a central median value (which would diminish the utility of the scoring system as a project comparison and evaluation tool).

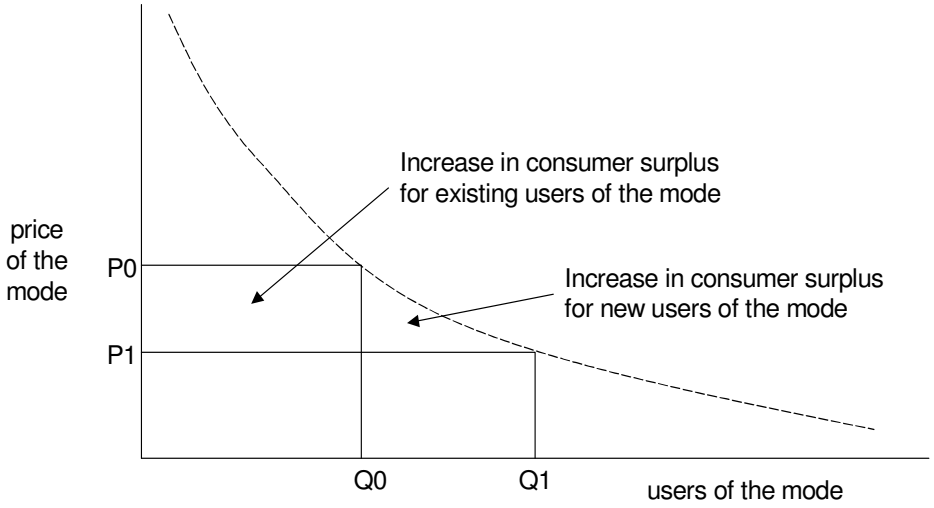
Section 2.2.5 Calculation of User Benefits[1]

User benefits requires a slightly more complex calculation that is similar to that needed for measures based on travel time savings – but includes time savings enjoyed by new riders as well. The user-benefits-measure has several advantages over "time savings" and "new riders" as an indicator of travel benefits;

- It is sensitive to changes in both travel times and travel costs, and recognizes benefits for both existing transit users and new users diverted from other modes;
- It puts direct transportation benefits into a single unit of measurement and permits them to be summed and uses as an overall measure of transportation benefits in the evaluation of alternatives;
- The user benefits measure is based on the concept of "consumer surplus" – a well established method provided by mirco-economic theory for measuring benefits.

[1] Users Guide to SUMMIT

Figure 2 – Microeconomic Principles of Consumer Surplus



Price (P_O) is the price of the Do-Nothing alternative for transit travel between two areas. At this price, R_O riders will be attracted to transit. A transit alternative in the corridor would reduce the generalized price of transit for this alternative to $P_{1.}$ This price reduction is largely the result of lower travel times, though it could reflect a lower (or higher)fare as well. Demand forecasts for the alternative indicated that R_1 riders would use transit for this interchange if the project was built.

The impacts on existing riders are represented by what each rider currently pays for the benefits available from making the transit trip. With the improvements introduced by the alternative, each existing rider would pay only P1 for the same benefits. Thus, each existing rider enjoys a savings, or "surplus", equal to (P0-P1). Since there are R0 existing riders, the total savings to existing riders are simply:

$$(P_0-P_1) * R_0$$

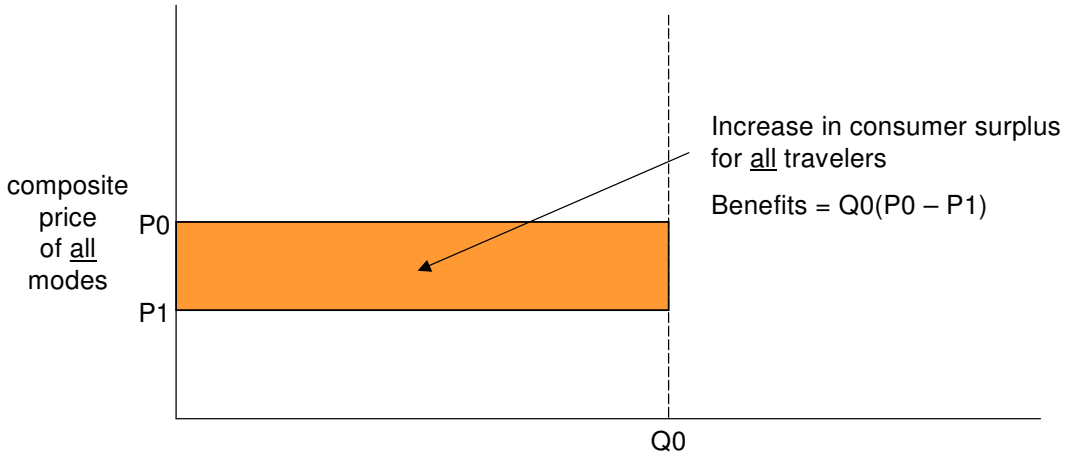
Impacts on new riders are similar. The "average" new rider switches at a price equal to the between the new and old prices, (P0 + P1)/2. The average new rider saves an amount equal to the difference between the price at which the individual switched modes and the eventual price, P1:

$$\frac{(P_0 + P_1)}{2} - P1 = \frac{(P_0 - P_1)}{2}$$

The user benefit definition is broadened when user benefits are considered across several modes. Riders include all travelers. This definition eliminates the issue of

travelers that switch between two modes . The price they pay is the composite price that combines the costs of all modes.

Figure 3 – Composite Utility for All Travelers



This composite price is computed from the (logit) mode choice model used to estimate shares among the competing modes. This measure of system mobility – often referred to as "composite" utility or impedance -- is taken directly from the denominator of the logit model, and converted to equivalent minutes of "in-vehicle" time, based on the locally determined coefficient on in-vehicle time.

$$\text{price in utiles}_{\text{all modes}} = \ln\left(\exp(U_{auto}) + \exp(U_{bus}) + \exp(U_{rail})\right)$$

$$\text{price in minutes}_{\text{all modes}} = \frac{\text{price in utiles}_{\text{all modes}}}{\text{coefficient}_{\text{in-vehicle time}}}$$

All modes of transit are rolled up to produce an aggregate cost, or "price" of transit. Similarly, a price for all auto modes is produced. Auto and transit "prices and quantities" are written directly from the travel forecasting procedures to files that the Summit software will then used to tabulate changes in composite mobility, and finally covert to minutes of system user benefits. The equations shown above are the primary calculations that occur within Summit.

The final price – or utility of all modes – is a measure of attractiveness of all modes. This value is further reduced to access markets based on the transit access representation employed in the local the travel forecasting procedures.

Section 2.3 Non-Recurring Highway Congestion

Section 2.3.1 Highway Incident Analysis

Highway incidents are a major cause of highway travel delay. Typically, these incidents include crashes; disabled vehicle on the roadway; vehicle spills; etc. For the purpose of the highway incident congestion component of the ARC project prioritization process, only crashes were analyzed. The decision to analyze only crashes was based of the unavailability of incident data, other than crash data, for all roads in the metro area.

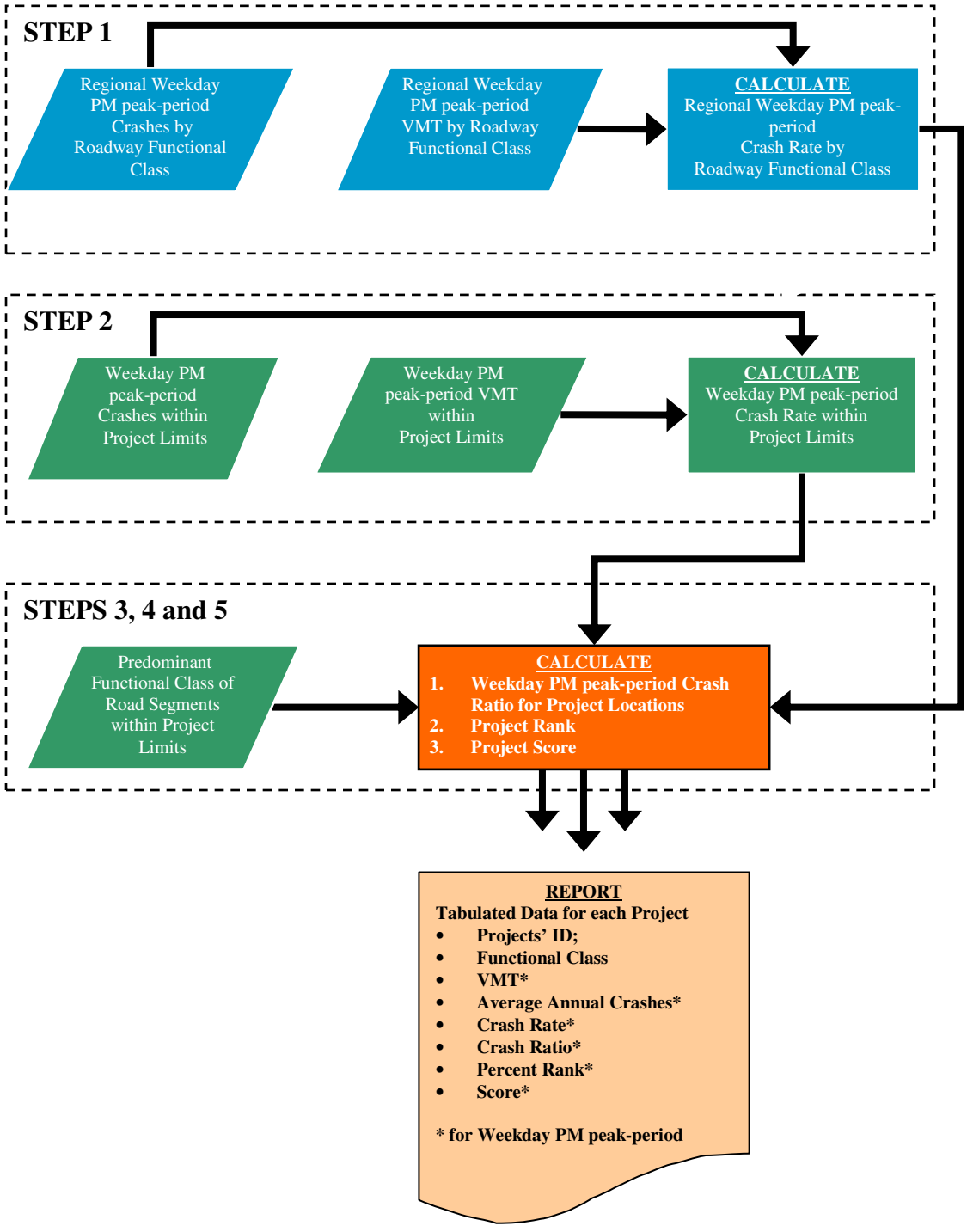
Generally, the duration of congestion resulting from a particular crash is directly related to the number of lanes closed or blocked and the duration of the lane closure. However, data about the number of lanes closed or the duration of lane closure for crashes on all roads in the Atlanta metro area was not available. Consequently, this analysis does not measure the actual delay caused by crashes but provides a proxy measure – the Crash Ratio – that compares the crash rate at a particular road segment (the segment within a project's limits) to a region-wide crash rate on roadways of similar functional classification. The interpretation here is that a roadway segment with a Crash Ratio greater than 1.0 experienced a crash rate that is higher than the regional average for facilities of similar functional class and thus would likely have experienced higher than average incident delays.

Section 2.3.2 Highway Standard Methodology

The analysis contained five steps, described below and illustrated in Figure 4.

- Step 1: Determine the Regional Crash Rates by Functional Class for the weekday PM peak-period (3:01 PM and 7:00 PM).
- Step 2: Determine the Crash Rates on the route(s) within each project's limits, for the weekday PM peak-period.
- Step 3: Determine the Project Locations' Crash Ratio (i.e. the ratio of the project location crash rate to the regional crash rate for facilities of similar functional class).
- Step 4: Rank the projects by Crash Ratio.
- Step 5: Assign a score to each project based on the project's rank.

Figure 4 – Flow Chart for Highway Incident Analysis (Simplified)


STEP 1
Regional Weekday PM peak-period Crashes by Roadway Functional Class
Regional Weekday PM peak-period VMT by Roadway Functional Class
CALCULATE
Regional Weekday PM peak-period Crash Rate by Roadway Functional Class
STEP 2
Weekday PM peak-period Crashes within Project Limits
Weekday PM peak-period VMT within Project Limits
CALCULATE
Weekday PM peak-period Crash Rate within Project Limits
STEPS 3, 4 and 5
Predominant Functional Class of Road Segments within Project Limits
CALCULATE
1. Weekday PM peak-period Crash Ratio for Project Locations
2. Project Rank
3. Project Score
REPORT
Tabulated Data for each Project
• Projects' ID;
• Functional Class
• VMT*
• Average Annual Crashes*
• Crash Rate*
• Crash Ratio*
• Percent Rank*
• Score*
* for Weekday PM peak-period

Step 1: Determine the Regional Crash Rates by Functional Class for the weekday PM peak- period.

1.1. Determine the number of crashes that occurred on weekdays during the PM peak-period on each Functional Class of roadway in the 20-County area during the 5-year period 2000 to 2004:

The total number of weekday PM peak-period crashes for each Functional Class of roadway in the 20-county area for the years 2000 to 2004 ($C_{R,FC,WDS,PM}$) was obtained by running separate database queries for each Functional Class on the Georgia CARE 2000-2004 Crash Database. The results were copied to a spreadsheet.

1.2. Determine the Weekday PM-peak period Vehicle miles traveled (VMT) by Functional Class for the 20-County area (adjusted for HPMS data):

Firstly, the Weekday "All Day" and Weekday "PM-peak period" VMT by Functional Class for the 20-County area were obtained from the ARC 20-County Travel Demand Model. Then HPMS adjustment factors were determined by comparing the "All Day" VMT by Functional Class from the model with the HPMS daily VMT by Functional Class. The adjustment factors were then applied to the PM peak-period VMT from the model to determine the adjusted Regional VMT by Functional Class for a Weekday PM peak-period ($VMT_{R,FC,WD,PM}$).

1.3. Calculate the Regional Crash Rates by Functional Class ($CR_{R,FC}$) for the 20-County area, for the Weekday PM-peak period:

The Regional Crash Rates by Functional Class were calculated as follows:

$$CR_{R,FC,WDS,PM} = \frac{C_{R,FC,WDS,PM} * 260 * 10^8}{N * VMT_{R,FC,WD,PM}}$$

Where:

$CR_{R,FC,WDS,PM}$ is the Regional Crash Rate by Functional Class for weekday PM peak-period, reported as "Crashes per 100 Million Vehicle Miles Traveled"

$C_{R,FC,WDS,PM}$ is the total number of weekday PM peak-period Crashes that occurred on a particular Functional Class of roadway in the region for the 5-year period 2000 to 2004.

260 is the number of weekdays in a year.

10^8 is the 100 million constant.

N is the number of years of crash data.

$VMT_{R,FC,WD,PM}$ is the adjusted PM peak-period Regional VMT by Functional Class for an average weekday.

Step 2: Determine the Weekday PM peak-period Crash Rate for the route(s) within each project's limits.

2.1. Create GIS line layer shape files for the route(s) within each project's limits:

The line layer shapefiles were created in ArcGIS and were based on the "Milepoint Route Roads" line layer from the Georgia CARE GIS map. One line layer shape file was created for each project and contained all route(s) within the project's limits

2.2. Create GIS point layer shape files for all the crashes that occurred along the route within the project's limits:

Firstly, the CARE software was used to generate a GIS map of all crashes that had occurred in the 20-County region during the 5-year period of 2000 to 2004. These crashes were then saved as an ArcGIS point layer shape file.

The crashes that had occurred on the route(s) within each project's limit were then identified using ArcGIS "Select by Location" feature and saved as point layer shape files. One point layer shape file

containing the crashes that had occurred on the route(s) within each project's limits was created for each project.

2.3. Determine the number of crashes that had occurred on the route(s) within each project's limits on weekdays during the PM peak-period for the years 2000 to 2004:

The details of all crashes for each project location were contained in the attribute table of the project's point layer shapefile. A VBA application (HIDA) was created and used to perform several tasks including extracting the number of crashes that had occurred on a weekday (Monday through Friday), during the hours of 3:01 PM to 7:00 PM, during the 5-year period of 2000 to 2004 from the point layer shapefile attribute table. This data was extracted and summarized for each project.

2.4. Determine the Weekday PM peak-period VMT on the route(s) within each project's limits:

Weekday VMT for the PM peak-period is one of the link attributes of the loaded highway network in the ARC 20-County Travel Demand Model. A TP+ script (PrjInc) was created and used to extract key data from the loaded highway network. The script produced a text file report for each project. The report contained the key data attributes for all links within the project's limits, including a summation of the PM peak-period VMT from the links within each project's limits.

2.5. Calculate the Crash Rate ($CR_{R,FC}$) on the route(s) within each project's limits for the weekday PM peak-period during the years 2000 to 2004:

The Project Location Crash Rates were calculated as follows:

$$CR_{PL,WDS,PM} = \frac{C_{PL,WDS,PM} * 260 * 10^8}{N * VMT_{PL,WD,PM}}$$

Where:

$CR_{PL,WDS,PM}$ is the Crash Rate on the route(s) within the project's limits for the weekday PM peak-period, reported as "Crashes per 100 Million Vehicle Miles Traveled"

$C_{PL,WDS,PM}$ is the total number of weekday PM peak-period Crashes on the route(s) within the project's limits for the 5-year period 2000 to 2004.

260 is the number of weekdays in a year.

10^8 is the 100 million constant.

N is the number of years of crash data.

$VMT_{PL,WD,PM}$ is the PM peak-period VMT for an average weekday on the route(s) within the project's limits.

Step 3: Determine the Project Locations' Crash Ratio

The Project Location Crash Ratio is the ratio of the project location crash rate to the regional crash rate for facilities of a similar functional class. These crash ratios are indicators of the level of incidents on the route(s) within the project limits in relation to the level of incidents on all routes of the same functional class within the 20-County area.

3.1. Determine the predominant Functional Classification of the route(s) within each project's limits:

A single project may include routes with different Functional Classification. Where such occurred, the Functional Classification that made up the longest section of the project was considered as the predominant Functional Class and for the purpose of this analysis, that Function Class was used as the representative Functional Class for the entire project.

A TP+ script (PrjInc), mentioned previously, was created and used to extract key data from the loaded highway network. The script produced a text file report for each project. Each report contained

the key data attributes for all links within a project's limits, including a summary of the Functional Class and length of all links within the project's limits.

A VBA application (Get Attributes) was created and used to process the data in the "PrjInc" text file reports and determine the predominant Functional Class of the routes within each project's limits.

3.2. Calculate the Project Location Crash Ratio:

A VBA application (HIDA), mentioned previously, was created and used to process several steps of the highway incident analysis including the calculation of the Project Location Crash Ratio.

The "HIDA" application used the project's predominant Functional Class to identify the Functional Class specific Regional Crash Rate that had to be used to calculate the Crash Ration for the particular project. The following calculation was then performed by HIDA for each project:

$$CRATIO_{PL,WDS,PM} = \frac{CR_{PL,WDS,PM}}{CR_{R,FC,WDS,PM}}$$

Where:

$CRATIO_{PL,WDS,PM}$ is the Crash Ratio for the route(s) within the limits of a particular project, for the weekday PM peak-period,. NOTE: The predominant Functional Class of the route(s) within the project's limit must be the same as the Functional Class attributed to the Regional Crash Rate used to derive the Crash Ratio."

$CR_{PL,WDS,PM}$ is the Crash Rate on the route(s) within the project's limits for the weekday PM peak-period.

$CR_{R,FCx,WDS,PM}$ is the weekday PM peak-period Regional Crash Rate for a Functional Class similar to the predominant Functional Class within the project's limits.

Step 4: Rank the projects by Crash Ratio.

4.1. A Percent Ranking of the projects' Crash Ratios was done by the HIDA application. The projects were ranked from 0.0 (for lowest Crash Ratio) to 1.0 (for highest Crash Ratio).

Step 5: Assign a Highway Incident Score to each project based on the project's rank.

5.1. As was the case with the recurring congestion component, a uniform distribution was used in determining the final scores for the non-recurring congestion scores. Specifically, each project was assigned a integer score ranging from 0 to 20 based on the percent rank of the Crash Ratio, with each of the 21 possible score values assigned to an equal number of projects.

Tools and Data Used for the Analysis

The following tools and data sources were used for the Highway Incident Analysis:

Tool	Data	Use and Output
Georgia CARE Crash Analysis Software v 8.2.19.0	a. Georgia CARE 2000 – 2004 Crash Database. b. Georgia CARE GIS "Milepost Route Roads" line layer shape file.	a. To generate point layer shape files containing all crashes (and associated crash details) that occurred on each functional class of roadway in the 20-County area during the 5-year period 2000 to 2004. b. To generate a line layer shapefile containing the road routes in the 20-County area. c. To determine the number of crashes that had occurred on all roads in the 20-County area.

Tool	Data	Use and Output
Microsoft Excel	a. Regional VMT by Functional Class for the PM peak-period (adjusted for HPMS). c. Number of Crashes by Functional Class obtained from the 2000-2004 Georgia CARE Crash database.	a. To calculate the Regional Crash Rate by Functional Class for the 20-County area.
ArcGIS	a. Georgia CARE GIS "Milepost Route Roads" line layer shape file. b. Crash data for the 20-County area. A point layer generated from Georgia CARE 2000 – 2004 Crash Database.	a. To create a line layer shapefile for each project. Each line layer shape file contained the route(s) within the project's limits. b. To create a point layer shapefile for each project. Each point layer shape file contained data on the crashes that had occurred on the route(s) within the project's limits.
TP+ script (PrjInc)	a. Loaded 2005 Highway Network and associated network attributes from ARC's 20-county travel demand model.	a. To extract weekday PM peak-period VMT for all highway network links within each project's limits. b. To extract data from the Highway Network about the functional classification and length of each highway network link within each project's limits.
Excel VBA Tool (Get Attributes)	a. Individual reports for each project, created as output from TP+ script (PrjInc)	a. To process text reports from TP+ script (PrjInc) for each project, extract relevant data, including the following, and place that data into a newly created Excel spreadsheet: • Weekday PM peak-period VMT for all links within each project's limits. • Predominant Functional Class of route(s) within each project's limits.

Tool	Data	Use and Output
Excel VBA Tool (HIDA)	a. Crash data contained in the attribute table of each project's point layer shape file. b. Weekday PM peak-period VMT and predominant Functional Class for the route(s) within each project's limits.	a. To process GIS point layer attribute tables and extract data including the number of crashes than occurred on weekdays during the hours of 3:00 PM and 7:00 PM (the PM peak-period). b. To process data, perform calculates and generate a comprehensive report, in spreadsheet format, of the input data, ranking and score for each project.

Exception to the Standard Methodology

The analysis of proposed facilities did not follow the standard methodology described above. For proposed facilities there are no existing routes and thus no historical crash data. Therefore the following methodology was used for the analysis of proposed facilities:

1. Identify the primary route currently being used to get to the locations that will be connected by the proposed facility. This process involved some degree of professional judgment.

2. Perform the Highway Incident Analysis, as described in the standard methodology, on the identified route.

Consequently, a proposed facility was awarded a Highway Incident Score based on the analysis of the primary route that currently joins the locations that the proposed facility would connect.

Section 2.4 Transit Incident Congestion

To determine the impact of transit projects on incident-based roadway congestion, an original formula was devised to estimate the number of crashes prevented from occurring on the roadway system as the result of a specific transit investment. This effective reduction in crashes, which in turn leads to a commensurate reduction in incident-based congestion, can then be used as an indicator of how well the transit

project mitigates roadway congestion resulting from crashes (i.e., non-recurring congestion).

Transportation safety statistics have consistently shown that transit is a safer mode of travel than driving in terms of average collisions per passenger mile. This improvement in safety is observed to varying degrees with all major transit technologies. By calculating the difference between the respective crash rates for private vehicle travel and the transit technology for a particular project, and then applying this difference to the passenger mileage for the project in question, an estimate of the number of crashes prevented can be computed. This technique assumes that all travel handled by a new transit facility would otherwise be handled as private vehicle travel on the existing roadway system if the transit service were not provided.

Three specific data items are required for each project to compute the estimated reduction in crashes due to the addition of transit service:

- **Daily Passenger Miles** – A project-specific estimate of the total number of passenger miles handled by the transit project on a typical weekday. For the proposed *Envision6* transit capital projects, ARC's 20-county travel demand model was used to determine passenger mileage estimates for the year 2030. Because the model measures ridership in terms of individual routes (rather than RTP projects, which may overlap one or more individual routes), the project-level estimates were computed by aggregating the ridership estimates for the portions of any routes that overlap with the project extents. (For the purposes of this exercise, it was assumed that ridership is evenly distributed along the length of each route.)

- **Average Crash Rate for Private Vehicle Travel** – The regional average roadway crash rate, based upon the most recent roadway safety data compiled by ARC and expressed in terms of passenger miles traveled. This input was held constant for all projects being evaluated.

- **Average Crash Rate for Travel by Transit** – The average crash rate for the specific transit technology (e.g. heavy rail, light rail, bus, etc.) associated with the project being considered, also expressed in terms of passenger miles traveled.

Table 5 shows the mode- and technology-specific crash rates that were used in this analysis, expressed in terms of crashes per 100 million passenger miles. When possible, local rates were used rather than national averages. Such local data were available for private vehicle travel (from ARC roadway safety data) as well as for both bus and heavy rail transit (from the Federal Transit Administration's National Transit Database (NTD)). Since there are no existing light rail or commuter rail facilities in the Atlanta region, national averages from the Bureau of Transportation Statistics' National Transportation Statistics (NTS) database were used.

Table 5 – Crash Rates for Specific Travel Modes and Transit Technologies

Mode/Technology of Travel	Crashes per 100 Million Passenger Miles	Source
Private Vehicle	289.8	Atlanta Regional Commission
Transit: Bus	48.2	NTD (MARTA, CCT), 2001
Transit: Heavy Rail	0.5	NTD (MARTA), 2001
Transit: Light Rail	39.0	NTS National Average, 2002
Transit: Commuter Rail	0.9	NTS National Average, 2002

For each project being evaluated, the most appropriate technology-specific crash rate from Table 5 was used. Special consideration was necessary for Bus Rapid Transit (BRT) projects, since the term "BRT" is applied to a wide range of project types and specific crash rates are not typically reported for BRT as a standalone technology. In this analysis, either the light rail or local bus rate was used for BRT projects, depending on the specific project characteristics. More specifically, for BRT projects featuring a transit-exclusive right-of-way, the NTS national average crash rate for light rail was used, as the separation of transit vehicles from other types of traffic is considered to have a more significant effect on crash rates than the specific transit vehicle type. For mixed-traffic BRT facilities, the standard bus crash rate from the NTD was used.

Given the above data, the following formula was used to compute an estimate of the number of crashes removed from the roadway due to the addition of a specific transit facility:

$$\Delta_C = \frac{PM * 260}{10^8} * (CR_{PV} - CR_T)$$

Where:

Δ_C	is the net change in Crashes resulting from the addition of the transit project being considered.
PM	is number of daily Passenger Miles associated with the transit investment
260	is the number of weekdays in a year.
10^8	is the 100 million constant.
CR_{PV}	is the Crash Rate for private vehicle travel, expressed in collisions per 100 million passenger miles.
CR_T	is the Crash Rate for travel by transit for the specific transit technology corresponding to the project being considered, expressed in collisions per 100 million passenger miles.

Similar to the highway non-recurring congestion component, a uniform distribution was used in determining the final scores for the transit non-recurring congestion component. Each project was assigned an integer score ranging from 0 to 20 based on the percent rank of the total number of crashes prevented. Due to the low number of transit projects considered, the possible final scores were restricted to 0, 4, 8, 12, 16, and 20, with each of the 6 possible score values assigned to an equal number of projects.

Section 3.0 Environmental & RDP Scoring

The remaining 30% of the project scores considers project level environmental impact and agreement with ARC's Regional Development Plan policies by project and area type.

Section 3.1 Environmental Analysis

Of the 30 percent of the technical analysis score not specifically dedicated to congestion considerations, a total of fifteen points were allocated to the evaluation of the environmental impacts of transportation capital projects. To quantify the perceived impact, each project was assigned a scored based on the degree to which its geographic extents overlap with those of six specific environmentally-sensitive area types, with higher scores assigned to projects that best avoid such impacts. The methodology described in this section was applied to all projects subjected to the technical analysis, including both roadway capacity and transit capital projects.

The evaluation of environmental impacts was a GIS-based procedure, utilizing ESRI's ArcGIS software (version 9.1) as well as the Spatial Analyst extension to ArcGIS. The specific tool used to calculate the raw environmental impact scores was Spatial Analyst's "Zonal Statistics" utility, which allows for calculation of area-based statistics for a series of input regions ("zones" – in this case, the geographic extents of individual projects). The Zonal Statistics utility requires two primary inputs: a continuous raster dataset whose individual cell values are used as the basis for statistical calculations, and a collection of polygonal features that are overlaid individually upon the input raster to geographically determine which cells from the base layer are included in the statistical calculations.

For the purposes of this exercise, the input raster was a layer representing the six area types that were considered: wetlands, floodplains, historic resources, parks, water bodies, and small area supply watersheds. Individual raster layers corresponding to each of these six area types were combined into a single composite layer using the Weighted Overlay tool, also a component of the ArcGIS Spatial Analyst extension. Listed below are more detailed descriptions of the six sensitive area types, along with the weights assigned to each layer for the Weighted Overlay operation. These specific area types and corresponding weights were chosen in consultation with staff from ARC's Land Use Planning Division.

1. Wetlands (30 percent) – The wetlands inventory was derived from the National Land Cover Database 2001 (NLCD 2001), which was compiled across all 50 states and Puerto Rico as a cooperative mapping effort of the Multi-Resolution Land Characteristics (MRLC) 2001 Consortium. This land cover database is being created using mapping zones and contains standardized land cover components useful for a variety of applications. A 100-foot buffer was applied to the coverage during the analysis.

2. Floodplains (30 percent) – This layer represents the 100-year and 500-year floodplain data as delineated on Flood Insurance Rate Maps (FIRMs) published by the Federal Emergency Management Agency. Features captured from the paper FIRMs include floodplain boundaries, political boundaries, FIRM panel areas, and USGS 7.5-minute quadrangle boundaries

3. Historic Resources (15 percent) – The historic resources inventory includes buildings, structures, historic sites, landscapes, and districts included in the Historic Preservation Division's Historic Resources Survey or listed in the National Register of Historic Places. This information was derived from NAHRGIS, a dataset compiled by the Historic Preservation Division of the Department of Natural Resources in collaboration with the Georgia Archaeological Site File at the University of Georgia.

4. Parks (15 percent) – This layer was created by ARC's Land Use Planning Division in coordination with various planning partners. The layer represents the publicly accessible parks within ARC's new greenspace database, an inventory of parks and protected greenspace in the 20-county Atlanta Region.

5. Water Bodies (5 percent) – The water bodies layer is a subset of GDOT's 1999 statewide DLG-F Polygonal Hydrography dataset. This dataset contains polygonal hydrographic features including lakes, ponds, reservoirs, swamps, and islands. Only water bodies with a total acreage of 5 acres or more were considered in the technical analysis. A buffer of 50 feet was applied to each feature prior to running the analysis.

6. Small Area Supply Watersheds (5 percent) – The source for the watersheds layer was 2003 data acquired from the Metropolitan North Georgia Water Planning District. This coverage was developed based on jurisdictional input regarding the locations of water supply intakes for small supply watersheds.

The second data input for the Zonal Statistics utility is the series of zones to be analyzed against the base raster, in this case, the geographic extents of the transportation capital projects being considered in the Envision6 technical analysis. Because the capital project features initially take the form of linear and point-location features, it was necessary to apply buffers to each feature in order to convert the dataset to a polygon-based format suitable for use with the Zonal Statistics tool. The size of the buffer applied to each feature was dependent upon the specific project type:

1. For linear roadway capacity projects (including HOV lanes) and expressway-based transit projects, a buffer of 100 feet was applied.
2. For point-location roadway capacity projects (e.g., interchange reconstruction), a buffer of 200 feet was applied.
3. For transit projects located on arterial roadway facilities, a buffer of 50 feet was applied.
4. For transit projects located on a dedicated off-street right-of-way, a buffer of 25 feet was applied.

Upon execution of the Zonal Statistics analysis, a series of values was a produced representing the sums of all raster cell values located within each buffered project boundary (where the raster cell values indicate the combined presence of any or all of the six sensitive area types at the location of that particular cell). This project-level summary data can then be viewed as a measure of the aggregate impact of each project on the six sensitive area types considered, with higher sums corresponding to a greater degree of impact.

The final step of the analysis was to convert the raw output values to integer scores ranging from 0 to 15, to serve as the 15-point environmental impact component of the

100-point technical analysis score. First, the raw scores were scaled to the range of 0 to 15, and redistributed such that each integer value between 0 and 15 contained an equal number of data points (i.e., a discrete uniform distribution). Finally, the distributed 15-point scores were inverted such that the highest score (15) corresponds to a minimal environmental impact while the lowest score (0) corresponds to the most severe impact.

Section 3.2 RDP Policy Support Analysis

The final component of the *Envision6* project prioritization technical analysis was an evaluation of the extent to which each project supports ARC's Regional Development Plan (RDP).

This evaluation was based primarily upon nine placed-based transportation objectives that reflect the major policy goals of the RDP, covering various themes such as transit accessibility, system management, connectivity between activity centers, and coordination with local land use planning. The nine objectives are described in greater detail below.

The RDP policy support criterion accounted for fifteen points of the 100-point scale used to evaluate transportation projects. Points were assigned by ARC staff jurisdictional representatives, based upon project descriptions provided by the sponsor. The specific distribution of the 15 points among the nine objectives varied based on the geographic context of the individual project. Specifically, each project was assigned one of the following eight "place type" designations specified in ARC's Unified Growth Policy Map (UGPM):

- Central City
- Regional Center
- Town Center
- Station Community
- Urban Neighborhood
- Mega Corridor
- Suburban Neighborhood
- Rural Area

A unique distribution of points by objective was determined for each of the above eight UGPM place type designations, with the various objectives weighted differently based on their relative importance in the context of the specific place type. For some place types, a particular objective may not be included at all if it is not considered to be among the key RDP priorities for that area. The detailed point assignment matrix for all place types and objectives is depicted in Table 6.

Table 6 – RDP Policy Support Point Assignment Matrix

	Place Type							
Stakeholder-Identified Transportation Objectives	**Central City**	**Regional Center**	**Station Community**	**Town Center**	**Urban Neighborhood**	**Mega Corridor**	**Suburban Neighborhood**	**Rural Area**
Transit Amenities	***up to 6***	***up to 4***	***up to 6***	***up to 4***	***up to 5***	***up to 6***	***up to 4***	***1***
Transit Project	3	2	3	2	3	3	2	-
Alternative: Roadway w/ transit element	*2*	*1*	*1*	*1*	*1*	*2*	*1*	-
Exclusive ROW for Transit	2	1	2	1	1	2	1	-
Area-Specific Considerations	1	1	1	1	1	1	1	1
System Management	***up to 4***	***up to 4***	***up to 4***	***up to 4***	***up to 2***	***up to 4***	***up to 2***	
Points per Management Program	2	2	2	2	1	2	1	
Connectivity between Centers	***up to 1***	***up to 2***	***up to 1***	***up to 2***	***up to 4***	***up to 2***	***up to 4***	***up to 4***
1 point for a total of 2 centers connected; 2 points for a total of 3 centers connected; 4 points for a total of 4 or more								
Supports Grid Network	**1**	**2**		**2**	**1**		**2**	**1**
Supports Regional ITS Architecture	**1**	**1**	**1**		**1**	**1**	**1**	
Supports Bike/Ped Plan	**1**	**1**	**2**	**1**	**1**	**1**	**1**	**1**
Preserves Existing Character				**1**				**7**
Local Land Use Commitment	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**

Following is a more detailed overview of the nine place-based objectives that formed the basis of the evaluation of RDP policy support.

1. Transit Amenities

This objective focuses on transit capacity additions, as well as roadway capacity additions that include a significant transit element, to encourage mode shift to non-SOV travel.

Up to six points were awarded for this objective, targeting several different types of projects and/or specific project characteristics:

- Transit Capital Project – Any capacity-adding transit project to include, but not limited to, construction of new transit facilities (on or off-road) and/or vehicle purchase to support existing service or implementation of new transit service.
- Roadway with Major Transit Element – Any capacity-adding roadway project that includes a significant specific provision to support new or expanded transit service (e.g. dedicated bus lanes).
- Exclusive ROW for Transit – Projects featuring a transit-exclusive right-of-way to support implementation of new or expanded transit service (applicable to either roadway or transit capacity additions).
- Area-Specific Considerations – Projects including a provision for an additional amenity to support transit service on that facility or demonstrates that the proposal is associated with another transit project that will support transit service on that facility, (e.g., transit station access, P&R lot access, demand-response service).

2. System Management

This objective targets projects where the project sponsor has demonstrated a commitment to protecting the investment on the facility through specific provisions designed to reduce demand, better manage travel demand, or manage access to the facility over time. Up to 4 points were awarded for this objective.

To be eligible, a specific element must be included as part of the project proposal that provides for travel demand management or access management along the project facility, or the proposal must demonstrate that the project is a result of, or compatible with, a relevant land use or transportation study with a system

management component. System management, for this application, is broadly defined to include access management (provisions that control access to the facility), travel demand management (provisions to reduce demand for travel on the facility), and/or managed-lane concepts (provisions to better manage existing demand for the facility).

3. Connectivity between Centers

This objective targets projects that improve regional mobility by providing connectivity between centers. To receive points in this category, a project must connect two centers (1 point), three centers (2 points), or 4 or more centers (4 points). "Centers," for the purposes of this objective, are defined as the Central City, Regional Center, Station Community, and Town Center UGPM place types.

4. Supports Grid Network

This objective targets projects that improve the density of the street grid in order to promote improved local circulation within and around activity and town centers and disperse traffic load on the street system. Up to one point was awarded for this objective. To be eligible, the proposal must demonstrate that capacity addition enhances street network connectivity.

5. Supports Regional ITS Architecture

This objective targets projects that include a provision to manage traffic flow on the facility through implementation of intelligent transportation systems (ITS) elements that support the regional ITS architecture. Up to one point was awarded in this category. To be eligible, the proposal must include a *specific* ITS provision, consistent with the regional ITS architecture, that will support improved traffic flow on the facility or demonstrate that the proposal is associated with another ITS project that will support improved traffic flow on that facility (e.g., electronic toll collection, transit automatic vehicle location systems, and ramp meters). It is assumed for this application that signal synchronization will be included with new roadway capacity additions; therefore, signal retiming does not justify a point reward, by default, as a result.

7. Supports Bicycle/Pedestrian Plan

This objective targets projects that include a specific provision for construction of new bicycle or pedestrian infrastructure that is consistent with the ARC Bicycle Transportation and Pedestrian Walkways Plan and supports a "Complete Streets" concept. Up to 2 points were awarded for this objective. To be eligible, the proposal must include a provision for construction of new bicycle/pedestrian infrastructure that is consistent with the 2002 Regional Bicycle and Pedestrian Plan Strategies (see Section V(C)(i), Strategy 1).

8. Preserves Existing Character

This objective targets projects where the project sponsor has demonstrated a commitment to constructing the project in a manner that respects the existing character of surrounding land uses. The objective was applied only to two UGPM place types: Town Center (up to one point awarded) and Rural Area (up to 7 points awarded). To be eligible for these points, the proposal must demonstrate a commitment that final design of the project will be in keeping with the surrounding community or environmental context. Examples include specific provisions that address aesthetic elements (such as lower design speeds, on-street parking, trees, etc.) in a Town Center or constructing roadways to retain the natural appearance and landscape in a Rural Area.

9. Local Land Use Commitment

This objective targets projects that comply with a locally-initiated visioning process where there is a demonstrated local commitment to implement that vision. Up to one point was awarded for this objective. To be eligible, the project must demonstrate that it is a result of, or compatible with, a locally-initiated visioning process to include, but not limited to, corridor plans or LCI studies.

Finally, it should be noted that the RDP policy support score values were not redistributed to conform to a discrete uniform distribution, in contrast to the other components of the technical analysis. This is due to the fact that the scores for a large number of projects were clustered at the low end of the 15-point range (i.e. a final score or 0, 1, or 2), making it impractical to redistribute the scores in such a manner.

Maricopa Association of Governments
(MAG)

CHAPTER TWO

GOALS, OBJECTIVES AND PRIORITY CRITERIA

Regional goals and objectives provide the planning process with a basis for identifying options, evaluating alternatives and making decisions on future transportation investments. The MAG Transportation Policy Committee has identified a total of four goals and 15 objectives, which were approved on February 19, 2003. In addition, Arizona Revised Statute 28-6354.B directs MAG to develop criteria to establish the priority of corridors, corridor segments, and other transportation projects. As part of the regional transportation planning process, MAG applied various priority criteria for the development of the Regional Transportation Plan (RTP).

Goals and Objectives

A goal is a general statement of purpose that represents a long-term desired end to a specific state of affairs. It is generally measurable by qualitative means. By identifying broad goals that are both visionary and practical, and which respond to the values of the region, the focus of the planning process can be more readily communicated to the public. The goals, in turn, can be defined in greater detail by specifying multiple objectives for each goal.

An objective is very similar to a goal, as it represents a desired end to a specific state of affairs. However, an objective is an intermediate result that must be realized to reach a goal. The definition of an objective is usually more focused than that of a goal and is typically more subject to being measured. Objectives can be further assessed through performance measures that are identified for each objective.

Certain goals and objectives are related to the way in which the regional transportation system is performing overall. Others may be used to evaluate individual components of the overall transportation system or to evaluate proposed projects. They can also serve as the basis to monitor how the transportation system performs as the RTP is implemented. In addition, goals and objectives relate to the planning process, and the importance of accountability during the development and implementation of the plan. Individual goals with their supporting objectives are listed below.

Goal 1: System Preservation and Safety

Transportation infrastructure that is properly maintained and safe, preserving past investments for the future.

- **Objective 1A**: Provide for the continuing preservation and maintenance needs of transportation facilities and services in the region, eliminating maintenance backlogs.
- **Objective 1B**: Provide a safe and secure environment for the traveling public, addressing roadway hazards, pedestrian and bicycle safety, and transit security.

Goal 2: Access and Mobility

Transportation systems and services that provide accessibility, mobility and modal choices for residents, businesses and the economic development of the region.

- **Objective 2A**: Maintain an acceptable and reliable level of service on transportation and mobility systems serving the region, taking into account performance by mode and facility type.
- **Objective 2B**: Provide residents of the region with access to jobs, shopping, educational, cultural, and recreational opportunities and provide employers with reasonable access to the workforce in the region.
- **Objective 2C**: Maintain a reasonable and reliable travel time for moving freight into, through and within the region, as well as provide high-quality access between intercity freight transportation corridors and freight terminal locations, including intermodal facilities for air, rail and truck cargo.
- **Objective 2D**: Provide the people of the region with transportation modal options necessary to carry out their essential daily activities and support equitable access to the region's opportunities.
- **Objective 2E**: Address the needs of the elderly and other population groups that may have special transportation needs, such as non-drivers or those with disabilities.

Goal 3: Sustaining the Environment

Transportation improvements that help sustain our environment and quality of life.

- **Objective 3A**: Identify and encourage implementation of mitigation measures that will reduce noise, visual and traffic impacts of transportation projects on existing neighborhoods.
- **Objective 3B**: Encourage programs and land use planning that advance efficient trip-making patterns in the region.
- **Objective 3C**: Make transportation decisions that are compatible with air quality conformity and water quality standards, the sustainable preservation of key regional ecosystems and desired lifestyles.

Goal 4: Accountability and Planning

Transportation decisions that result in effective and efficient use of public resources and strong public support.

- **Objective 4A**: Make transportation investment decisions that use public resources effectively and efficiently, using performance-based planning.
- **Objective 4B**: Establish revenue sources and mechanisms that provide consistent funding for regional transportation and mobility needs.
- **Objective 4C**: Develop a regionally balanced plan that provides geographic equity in the distribution of investments.
- **Objective 4D**: Recognize previously authorized corridors that are currently in the adopted MAG Long-Range Transportation Plan; i.e., Loop 303 and the South Mountain Corridor.

- **Objective 4E**: Achieve broad public support for needed investments in transportation infrastructure and resources for continuing operations of transportation and mobility services.

Priority Criteria

Arizona Revised Statute 28-6354.B directs MAG to develop criteria to establish the priority of corridors, corridor segments, and other transportation projects. These criteria include public and private funding participation; the consideration of social and community impacts; the establishment of a complete transportation system for the region; the construction of projects to serve regional transportation needs; the construction of segments to provide connectivity on the regional system; and other relevant criteria for regional transportation.

As part of the regional transportation planning process, MAG has applied these kinds of criteria, both for the development and the implementation of the Regional Transportation Plan (RTP). The RTP was developed through a performance-base process that evaluated alternatives relative to a range of performance measures. Also, specific criteria were considered as part of the process to schedule the implementation of transportation projects throughout the duration of the planning period. The discussion below describes how the criteria applied in the RTP planning process correspond to the categories included in ARS 28-6354.B.

Extent of Local Public and Private Funding Participation

A higher level of local public and private funding participation in the RTP benefits the region by leveraging regional revenues and helping ensure local government commitment to the success of the regional program. The extent of local public and private funding participation is addressed in a number of ways in the MAG transportation planning process.

- **Project Matching Requirements -** In developing funding allocations among the various RTP components and project types, local matching requirements have been established. The local matching requirements in the RTP are:

  - 30 percent major street projects, including ITS elements.
  - 30 percent bicycle and pedestrian projects.
  - For air quality and transit projects involving Federal funds, minimum Federal match requirements were assumed. Depending on the specific project funding mix, this match may be provided from regional revenue sources.

- **Private Funding Participation -** As part of the policies and procedures developed for the Arterial Street Life Cycle Program, private funding participation is recognized as applicable local match for half-cent funds for street and intersections projects. This policy helps free local monies that may then be applied to additional transportation improvements.

- **Local Government Incentives -** In the Arterial Street Life Cycle Program, incentives to make efficient use of regional funds have been established by ensuring that project savings by local governments may be applied to new projects in the jurisdiction that achieved those savings.

Social and Community Impacts

Regional transportation improvements can have both beneficial and negative social and community impacts. It is important to conduct a thorough assessment of these impacts, to ensure that they are taken into account in the decision-making process. The MAG planning effort assesses social and community impacts at each key stage of the transportation planning and programming process. In addition, it should be noted that similar efforts are carried out by the agencies implementing specific transportation improvement projects.

- **Public Participation and Community Outreach -** An aggressive citizen participation and outreach program is conducted to obtain public views on the potential community and social impacts of transportation improvements. In particular, input is sought regarding the possible impacts of specific transportation alternatives on the community's social values and physical structure.

- **Social Impact Assessment -** The social impact of transportation options is evaluated as part of the Title VI/Environmental Justice assessment. In this assessment, potential transportation impacts are evaluated for key communities of concern, including minority populations, low-income populations, aged populations, mobility disability populations, and female head of household populations. In addition, community goals are taken into account by basing future travel demand estimates, on local land use plans.

- **Corridor and Community Impact Assessment -** Corridor-level analyses are conducted, which assess the possible social and community impacts of alternative facility alignments based on neighborhood factors such as noise, air quality and land use. Community impacts of transportation facilities are further analyzed by assessing air quality effects through the emissions analysis of plan alternatives, as well as conducting a Federally required air quality conformity analysis of the RTP. In addition, the process for annually updating the Regional Transportation Improvement Program includes project air quality scores, which reflect the potential community impacts of the projects.

Establishment of a Complete Transportation System for the Region

The RTP calls for major investments in all elements of the regional transportation system over the next several decades. It is critical that these expenditures result in a complete and integrated transportation network for the region. The MAG planning process responds directly to this need by conducting transportation planning at the system level, giving priority to segments that can lead to a complete transportation system as quickly as possible, and maintaining a life cycle programming process for all the major modes.

- **System Level Planning Approach -** The regional planning effort is conducted at the system level, taking into account all transportation modes in all parts of the MAG geographic area. This systems level approach is applied in identifying and analyzing alternatives, as well as specifying the final RTP. In this way, the complete transportation needs of the region, as a whole, are identified and addressed in the planning process.

- **Project Development Process and Project Readiness -** The implementation of regional transportation projects requires a complex development process. This process involves extensive corridor assessments, environmental studies, and engineering concept analyses. This is followed by right-of-way acquisition and final design work, before actual construction may begin. For a variety of reasons, certain projects may progress through this process more rapidly than others. By moving forward, where possible, on those projects with the highest level of readiness for construction, important transportation improvements can be delivered as quickly as possible.

- **Progress on Multiple Projects -** Major needs for transportation improvements exist throughout the MAG Region. The scheduling of projects is aimed at proceeding with improvements to the transportation network throughout the planning period in all areas of the region. This will lead toward a complete and functioning regional transportation system that benefits all parts of the MAG Region.

- **Revenues, Expenditures and Life Cycle Programming -** Cash flow patterns from revenue sources limit the amount of work that can be accomplished within a given period of time. Project expenditures need to be scheduled to accommodate these cash flows. Life cycle programs have been established that take these conditions into account and implement the projects in the RTP for the major transportation modes: freeways/highways, arterial streets, and transit. The life cycle programs provide a budget process that ensures that the estimated cost of the program of improvements does not exceed the total amount of revenues available. This ensures that a complete transportation system for the region will be developed within available revenues.

As part of the life cycle programming process, consideration is given to bonding a portion of cash flows to implement projects that provide critical connections earlier than might otherwise be possible. This has to be weighed against the reduction in total revenues available for constructing projects, which results from interest costs.

Construction of Projects to Serve Regional Transportation Needs

The resources to implement the RTP are drawn from regional revenue sources and should address regional transportation needs. Transportation projects that serve broad regional needs should have a higher priority than those that primarily only serve a local area. At the same time, the nature of regional transportation needs varies across the MAG Region and the same type of transportation solution does not apply everywhere in the region. Enhancing the arterial network may represent the most pressing regional need in one part of the region, whereas adding new freeway corridors may be the key need in another; and expanding transit capacity may represent the best approach in yet another area. The process to develop the RTP recognized that this was the nature of regional transportation needs in the MAG Region. As a result, the RTP is structured to respond to different types of needs in different parts of the MAG Region.

Although the modal emphasis of the transportation improvements identified in the RTP varies from area to area, the effects of these improvements can be assessed using common measures of system performance and regional mobility. The measures that were utilized for this purpose are described below. These criteria were applied in the development of the RTP to evaluate alternatives and

establish implementation priorities. They can also be applied in the future to evaluate potential adjustments to the priority of corridors, corridor segments, and other transportation projects and services.

- **Facility/Service Performance Measures -** Facility performance measures focus on the amount of travel on specific facilities, the usage of transportation services, the degree of congestion, and other indicators of the level of service as provided:

  - Accident rate per million miles of passenger travel.
  - Travel time between selected origins and destinations.
  - Peak period delay by facility type and geographic location.
  - Peak hour speed by facility type and geographic location.
  - Number of major intersections at level of service "E" or worse.
  - Miles of freeways with level of service "E" or worse during peak period.
  - Average Daily Traffic on freeways/highways and arterials
  - Total transit ridership by route and transit mode.
  - Cost effectiveness: trips served per dollar invested.

- **Mobility Measures -** Mobility measures focus on the availability of transportation facilities and services, as well as the range of service options as provided:

  - Percentage of persons within 30 minutes travel time of employment by mode.
  - Jobs and housing within one-quarter mile distance of transit service.
  - Percentage of workforce that can reach their workplace by transit within one hour with no more than one transfer.
  - Per Capita Vehicle Miles of Travel (VMT) by facility type and mode.
  - Households within one-quarter mile of transit.
  - Transit share of travel (by transit sub-mode).
  - Households within five miles of park-and-ride lots or major transit centers

Construction of Segments that Provide Connectivity with other Elements of the Regional Transportation System

The phasing of the development of the transportation network should be done in a logical sequence, so that maximum possible system continuity, connectivity and efficiency are maintained. In the RTP, Appropriately located transportation facilities around the region enhance the general mobility throughout the region. To the extent possible, facility construction and transportation service should be sequenced to result in a continuous and coherent network and to avoid gaps and isolated segments, bottlenecks and dead-end routes. Segments that allow for the connection of existing portions of the transportation system should be given a higher priority than segments that do not provide connectivity.

Other relevant criteria developed by the regional planning agency

As part of the RTP, a series of objectives for the regional transportation network were identified. Two key objectives were to achieve broad public support for the needed investments, and to

develop a regionally balanced plan that provides geographic equity in the distribution of investments. Specific criteria related to these objectives are:

- Transportation decisions that result in effective and efficient use of public resources and strong public support.
- Geographic distribution of transportation investments.
- Inclusion of committed corridors.

Denver Regional Council of Governments
(DRCOG)

Table 4
Roadway Capacity Projects

Eligibility Criteria

Only regionally-funded roadway widening, new road, new interchange, interchange reconstruction, and Bus/HOV/BRT projects identified in the adopted networks for testing for the fiscally constrained *2035 Metro Vision Regional Transportation Plan* (will be listed in Appendix D after adoption) are eligible for implementation funding. Submittals can only be for "next meaningful phase" of the project jointly defined by applicant, CDOT, and DRCOG as described in Section III.B. Evaluation for the first seven criteria is based on the entire (full) project, not an individual phase(s). Within the urban growth boundary, arterial roadway projects must adhere to urban design standards and must demonstrate that sidewalks are present and will be maintained and replaced or will be added as part of the project. Outside the urban growth boundary, roadway projects must adhere to non-urban design standards and incorporate a high degree of access control. Any current bicycle or transit infrastructure must as a minimum be retained in kind.

Evaluation Criteria	Points	Scoring Instructions
Current congestion	0-12	Based on the degree of current (2006) congestion on the most congested segment of the project: 12 points will be awarded to projects with current congestion score of 18 or more; 0 points to projects with current congestion score of 6 or less; with straight-line interpolation between. Congestion for new road and interchange projects based on current travel paths. *Source: DRCOG congestion management program; sponsor may supply location-specific volume data to augment DRCOG data in computation of congestion score.)*
Safety	0-5	Based on the project's estimated crash reduction and weighted crash rate in comparison to the statewide average, up to 5 points will be awarded. Appendix E explains the point allocation. *Source: DRCOG or sponsor supplied crash data. Sponsors are encouraged to use qualified traffic personnel for this computation and are asked to indicate that they have done so as part of the application.*
Cost-effectiveness	0-10	Based on the project's current (2005) forecast cost per daily person-miles-of-travel (PMT), up to 10 points will be awarded as follows: • **For Bus/HOV/BRT, roadway widening, and new road projects:** 10 points will be awarded to projects with a cost per PMT of $50 or less; 0 points to projects with a cost per PMT of $550 or more; with straight line interpolation between. • **For interchange reconstruction and new interchange projects:** 10 points will be awarded to projects with a cost per PMT of $250 or less; 0 points to projects with a cost per PMT of $2,750 or more; with straight line interpolation between. • PMT for new road and interchange projects based on modeled usage estimates. *Source: DRCOG 2005 model data (daily)*
Condition of major structure	0-5	Based on the CDOT inspection per the National Bridge Inspection Standards of the included structure, nearby structure, or structure on current travel path, and the resultant bridge sufficiency rating: 5 points will be awarded if the bridge sufficiency rating is 20 or lower; 0 points will be awarded if the bridge sufficiency rating is 80 or higher; with straight line interpolation between. Source: DRCOG from CDOT
Long range plan score	0-15	Based on the score computed by DRCOG for project consideration in the fiscally constrained 2035 Metro Vision RTP process: 15 points will be awarded if the project's long range score was 80 or higher; 0 points will be awarded if the project's long-range score was 50 or lower; with straight line interpolation between. Source: DRCOG

Table 4 (cont.)
Roadway Capacity Projects

Evaluation Criteria	Points	Scoring Instructions
Transportation system management	0-5	1 point will be awarded for each of the following features to be added to or newly provided as part of the project, up to 5 points (of a possible 6): • Provision of raised, depressed, or barrier medians • Access consolidation • Provision of left-turn lanes at signalized intersections • Provision of signal interconnection • Provision of ITS infrastructure • Provision of infrastructure that implements an approved incident management plan.
Multimodal connectivity	0-10	1 point for each of the following, up to 9 points (of a possible 10), will be awarded for the following features being included in and constructed by the project: o including transit operational features (e.g., bus pads, queue jump lanes) o including transit amenities (e.g., bus shelters, multimodal information kiosks) o building a new path, bike lanes, or extra-width curb lanes to accommodate a bike facility on a regional or locally adopted plan o grade separating an existing bike/ped trail from the road o providing bike amenities (e.g., bike racks, bike lockers) o building pedestrian links, in addition to what is required (e.g., sidewalks), connecting to adjacent key pedestrian-generating facilities (e.g., parks, transit stations/lots, businesses) as part of the project o providing pedestrian-oriented street lighting o providing street trees and/or a landscaped buffer between the roadway and sidewalk within the street zone o detaching or widening sidewalks beyond what is required o incorporating transit priority or bicycle activation at project signals 1 point for commitment by applicant to fund telework, carpooling, and/or vanpooling promotion efforts, targeted to the project corridor (funding identified as part of the project or by contributing funds to a TMO and contributing funds must total a minimum of 2% of the total project cost).
Overmatch	0-12	Based on providing *above* the minimum 20 percent local funding match: 12 points will be awarded to projects with local match of 50 percent or more; 0 points to projects with the minimum 20 percent local match; with straight line interpolation between.
Project-related Metro Vision implementation and strategic corridor focus	0-14	Up to 14 points will be awarded as described in Appendix F.
Sponsor-related Metro Vision Implementation	0-12	Up to 12 points will be awarded for sponsor actions implementing Metro Vision. Appendix G explains the specific criteria.
Total	**100**	

Table 5
Roadway Operational Improvement Projects

Eligibility Criteria

Projects on any roadway shown on the 2035 Metro Vision Regional Roadway System (assume Figure 32 of the 2030 Metro Vision RTP document as default) are eligible. Grade separations of any at-grade railroad crossing on the 2030 Metro Vision Regional Roadway System as depicted on Figure 25 of the 2030 Metro Vision RTP are eligible. Within the urban growth boundary, arterial roadway projects must adhere to urban design standards and must demonstrate that sidewalks are present and will be maintained and replaced or will be added as part of the project. Outside the urban growth boundary, roadway projects must adhere to non-urban design standards and incorporate a high degree of access control. Any current bicycle or transit infrastructure must as a minimum be retained in kind.

Evaluation Criteria	Points	Scoring Instructions
Current congestion	0-12	Based on the degree of current (2006) congestion on the most congested approach or segment of the project: 12 points will be awarded to projects with current congestion score of 18 or more; 0 points to projects with current congestion score of 6 or less; with straight-line interpolation between. *Sources: Roadways: DRCOG congestion management program. For grade separations, the congestion management program will use the following data as default: Number of trains/day: CDOT (divide by 24 for hourly estimate); Default average closure time = 3 min.; Default estimated recovery time multiplier=1.5. Sponsor may supply location-specific data to augment DRCOG or default data.*
Safety	0-7	Based on the project's estimated crash reduction and weighted crash rate in comparison to the statewide average, up to 7 points will be awarded. Appendix E explains the point allocation. *Source: DRCOG or sponsor supplied crash data. Sponsors are encouraged to use qualified traffic personnel for this computation and are asked to indicate that they have done so as part of the application.*
Cost-effectiveness	0-18	Based on the project's current estimated cost per vehicle hour of travel (VHT) reduced during the peak hour: 18 points will be awarded to projects with a cost per VHT reduced of $20,000 or less; 0 points to projects with a cost per VHT reduced of $200,000 or more; with straight line interpolation between. **For intersection operations**, use intersection operations software (for multiple intersections, sum individual intersection improvements). **For grade separations**, compute delay by [(average closure time) * (estimated recovery multiplier)/2]*[number of trains per hour]*[volume in peak hour]/60. *Source: applicant computations.*
Usage	0-9	Based on current AWDT/lane of the major roadway (average for overall project length): projects with AWDT/lane of 17,000 or more will receive 9 points; projects with AWDT/lane of 5,000 or less will receive 0 points; with straight line interpolation between.
2035 MVRTP emphasis corridors	0-3	3 points will be awarded to projects on *emphasized* freeways (mainline or ramps) or major regional arterials on the 2035 Metro Vision RTP Emphasis Corridors map (assume Figure 27 of the 2030 Metro Vision RTP document as default). 2 points will be awarded to projects on *emphasized* principal arterial segments on that map.

Table 5 (cont.)
Roadway Operational Improvement Projects

Evaluation Criteria	Points	Scoring Instructions
Transportation system management	0-5	1 point will be awarded for each of the following features to be added to or newly provided as part of the project, up to 5 points (of a possible 6): • Provision of raised, depressed, or barrier medians • Access consolidation • Provision of left-turn lanes at signalized intersections • Provision of signal interconnection • Provision of ITS infrastructure • Provision of infrastructure that implements an approved incident management plan.
Multimodal connectivity	0-8	1 point for each of the following, up to 7 points (of a possible 10), will be awarded for the following features being included in and constructed by the project: ◦ including transit operational features (e.g., bus pads, queue jump lanes) ◦ including transit amenities (e.g., bus shelters, multimodal information kiosks) ◦ building a new path, bike lanes, or extra-width curb lanes to accommodate a bike facility on a regional or locally adopted plan ◦ grade separating an existing bike/ped trail from the road ◦ providing bike amenities (e.g., bike racks, bike lockers) ◦ building pedestrian links, in addition to what is required (e.g., sidewalks), connecting to adjacent key pedestrian-generating facilities (e.g., parks, transit stations/lots, businesses) as part of the project ◦ providing pedestrian-oriented street lighting ◦ providing street trees and/or a landscaped buffer between the roadway and sidewalk within the street zone ◦ detaching or widening sidewalks beyond what is required ◦ incorporating transit priority or bicycle activation at project signals 1 point for commitment by applicant to fund telework, carpooling, and/or vanpooling promotion efforts, targeted to the project corridor (funding identified as part of the project or by contributing funds to a TMO and contributing funds must total a minimum of 2% of the total project cost).
Overmatch	0-12	Based on providing *above* the minimum 20 percent local funding match: 12 points will be awarded to projects with local match of 50 percent or more; 0 points to projects with the minimum 20 percent local match; with straight line interpolation between.
Project-related Metro Vision implementation and strategic corridor focus	0-14	Up to 14 points will be awarded as described in Appendix F.
Sponsor-related Metro Vision Implementation	0-12	Up to 12 points will be awarded for sponsor actions implementing Metro Vision. Appendix G explains the specific criteria.
Total	**100**	

Table 6
Roadway Reconstruction Projects

Eligibility Criteria

Projects on any roadway shown on the 2035 Metro Vision Regional Roadway System (assume Figure 32 of the 2030 Metro Vision RTP document as default) are eligible. Projects must reconstruct the travel way; other surface treatment projects are ineligible. Within the urban growth boundary, arterial roadway projects must adhere to urban design standards and must demonstrate that sidewalks are present and will be maintained and replaced or will be added as part of the project. Outside the urban growth boundary, roadway projects must adhere to non-urban design standards and incorporate a high degree of access control. Any current bicycle or transit infrastructure must as a minimum be retained in kind.

Evaluation Criteria	Points	Scoring Instructions
Pavement condition	0-20	Based on the pavement condition index computed per Appendix H: 20 points will be awarded to projects with a condition index of 25 or lower; 0 points to projects with a condition index of 50 or greater; with straight line interpolation between.
Safety	0-5	Based on the project's estimated crash reduction and weighted crash rate in comparison to the statewide average, up to 5 points will be awarded. Appendix E explains the point allocation. *Sponsors are encouraged to use qualified traffic personnel for this computation and are asked to indicate that they have done so as part of the application.*
Cost-effectiveness	0-16	Based on the project's current (2005) estimated cost per daily person-miles-of-travel (PMT): projects with a cost per PMT of $40 or less will receive 16 points; projects with a cost per PMT of $200 or more will receive 0 points; with straight line interpolation between.
Usage	0-9	Based on current AWDT/lane (average for overall project length): projects with AWDT/lane of 17,000 or more will receive 9 points; projects with AWDT/lane of 5,000 or less will receive 0 points; with straight line interpolation between.
Transportation system management	0-5	1 point will be awarded for each of the following features to be added to or newly provided as part of the project, up to 5 points (of a possible 6): • Provision of raised, depressed, or barrier medians • Access consolidation • Provision of left-turn lanes at signalized intersections • Provision of signal interconnection • Provision of ITS infrastructure • Provision of infrastructure that implements an approved incident management plan

Table 6 (cont.)
Roadway Reconstruction Projects

Evaluation Criteria	Points	Scoring Instructions
Multimodal connectivity	0-7	1 point for each of the following, up to 6 points (of a possible 10), will be awarded for the following features being included in and constructed by the project: ○ including transit operational features (e.g., bus pads, queue jump lanes) ○ including transit amenities (e.g., bus shelters, multimodal information kiosks) ○ building a new path, bike lanes, or extra-width curb lanes to accommodate a bike facility on a regional or locally adopted plan ○ grade separating an existing bike/ped trail from the road ○ providing bike amenities (e.g., bike racks, bike lockers) ○ building pedestrian links, in addition to what is required (e.g., sidewalks), connecting to adjacent key pedestrian-generating facilities (e.g., parks, transit stations/lots, businesses) as part of the project ○ providing pedestrian-oriented street lighting ○ providing street trees and/or a landscaped buffer between the roadway and sidewalk within the street zone ○ detaching or widening sidewalks beyond what is required ○ incorporating transit priority or bicycle activation at project signals 1 point for commitment by applicant to fund telework, carpooling, and/or vanpooling promotion efforts, targeted to the project corridor (funding identified as part of the project or by contributing funds to a TMO and contributing funds must total a minimum of 2% of the total project cost).
Overmatch	0-12	Based on providing *above* the minimum 20 percent local funding match: 12 points will be awarded to projects with local match of 50 percent or more; 0 points to projects with the minimum 20 percent local match; with straight line interpolation between.
Project-related Metro Vision implementation and strategic corridor focus	0-14	Up to 14 points will be awarded as described in Appendix F.
Sponsor-related Metro Vision Implementation	0-12	Up to 12 points will be awarded for sponsor actions implementing Metro Vision. Appendix G explains the specific criteria.
Total	**100**	

Table 7
Rapid Transit Projects

Eligibility Criteria

Only fixed guideway transit projects identified in the rapid transit system of the fiscally constrained 2035 Metro Vision RTP (assume Figure 33 of the Metro Vision RTP as default) are eligible for funding. The Regional Transportation District is the only eligible implementing agency (applicant).

Evaluation Criteria
The fiscally constrained rapid transit system reflects the results of a voter-approved initiative called FasTracks. Corridors and implementation timing were part of the package approved by the voters. The Policy herein reflects intent to provide funding as identified in Section III.E.3 to assist the implementation of FasTracks. Commitments in future years are envisioned but not specifically granted herein. RTD is required to submit funding request applications for relevant, meaningful, identifiable aspects of its approved FasTracks plan for DRCOG to honor the policy. Because the corridors and timing have voter approval, and because the DRCOG selection contribution is modest in comparison to the entire FasTracks program, it is not required that RTD funding requests in this project type be evaluated.

Table 8
Transit Passenger Facilities Projects

Eligibility Criteria

Any stations, transfer facilities, or park-n-Ride lots identified in the 2035 Metro Vision RTP (assume Appendices 1 and 2 of the 2030 Metro Vision RTP as default).

Evaluation Criteria	Points	Scoring Instructions
Usage	0-30	Based on the estimated average number of persons to be served per day at the new facility six months after its completion: 30 points will be awarded to projects serving more than 5,000 people; 0 points to facilities serving less than 1,500; with straight-line interpolation between.
Air Quality Benefits	0-8	Transit passenger facilities projects may reduce air pollution by reducing VMT. Based on the daily reduction in pounds of total air pollutants expected from this project, as a percentage of the regional total from mobile sources, 8 points will be awarded to projects which would reduce 0.3% of the regional total or more; 0 points to projects which would reduce no pollution; with straight-line interpolation between. *Source: sponsor estimates of VMT reduction from estimates of use, trip length, and prior mode.*
Multi-modal Connectivity	0-24	On the basis of number of modes[1] served at the new facility, 3 points will be awarded for each mode of travel served up to a maximum of 24 points.
Overmatch	0-12	Based on providing *above* the minimum 20 percent local funding match: 12 points will be awarded to projects with local match of 50 percent or more; 0 points to projects with the minimum 20 percent local match; with straight line interpolation between.
Metro Vision project-related implementation and strategic corridor focus	0-14	Up to 14 points will be awarded as described in Appendix F
Metro Vision sponsor-related Implementation	0-12	Up to 12 points will be awarded for sponsor actions implementing Metro Vision. Appendix G explains the specific criteria.
Total	**100**	

[1] Modes are defined as:

- Local or limited bus service
- express or regional bus service
- mall shuttle or circulator bus
- intra-regional commuter rail
- inter-regional commuter rail
- Light rail
- inter-city van/limo (gaming, ski areas
- inter-city rail (AMTRAK, ski train, etc.)
- private inter-city bus and charter bus service
- bicycle
- pedestrian
- auto parking
- rental car

Table 9
New Bus Service Projects

Eligibility Criteria

The following conditions must be met in order to be eligible as a new bus service project:

1. New bus service is defined as service where no other motorized transit for use by the general public currently exists.
2. New bus service must have an minimum of 3 years of detailed and allocated program funding that includes line item budgets for the following:
    a. Vehicles
    b. Physical improvements
    c. Marketing
    d. Operations
    e. Others as defined.
3. New bus service **must** employ a marketing program to identify and reach prospective riders, in both the short and long term. Sponsors must describe this program in the application and should include its costs unless another funding source is committed.
4. Any sponsor proposal for RTD to run the daily operation of a requested transit service must obtain concurrence from RTD in written form. RTD will only consider granting concurrence if sponsors submit formal requests to RTD that are received no later than 7 days after the solicitation for funding requests is announced.
5. Any requests for RTD concurrence on any other aspect of new bus service, besides running the daily operation of the new service as stated above, such as long-term funding support, must be submitted and received by RTD 30 days in advance of the funding request submittal deadline. RTD may request usage/cost-effectiveness data prior to issuing any concurrence.

Evaluation Criteria	Points	Scoring Instructions
Usage	0-16	Based on projected daily boardings that are anticipated 12 months after initiation of service: 16 points will be awarded to projects with boardings above the RTD Service Standard average (varies based on the specific bus service class and their appropriate Service Standard, as described in Appendix I); 0 points to projects with boardings below the RTD 10% Service Standard; with straight-line interpolation between. The specific classes of new bus service include: urban local, suburban local, express, regional, and call-n-ride. A detailed description of the estimated ridership must be supplied with the submittal, per Appendix I. An independent/peer review will be performed on the ridership.
Cost-effectiveness	0-15	Based on the projected subsidy per passenger that is anticipated 12 months after initiation of service: 15 points will be awarded to projects with a subsidy below the RTD Service Standard average (varies based on the specific bus service class and their appropriate Service Standard, as described in Appendix I); 0 points to projects with a subsidy above the RTD 10% Service Standard; with straight-line interpolation between.

Table 9 (cont.)
New Bus Service Projects

Evaluation Criteria	Points	Scoring Instructions
Long-term funding	0-15	15 points awarded to projects with an additional 2 years of total program funding support, beyond the required minimum of 3 years (5 years total), which must be obtained in writing from either: 1. An independent funding source; 2. RTD via a letter of support; or 3. A combination of the two. Zero points will be awarded to projects that do not define an additional 2 years of funding support.
Connectivity	0-8	4 points will be awarded if the new service fills an existing service gap. 2 points will be awarded if the new service connects to existing park-n-Ride lots and transit stations. 1 point will be awarded for each transit route connected (up to 2 routes)
Air Quality (VMT)	0-8	New bus service projects may reduce air pollution by reducing VMT. Based on the daily reduction in pounds of total air pollutants expected from this project, as a percentage of the regional total from mobile sources, 8 points will be awarded to projects which would reduce greater than 0.3% of the regional total; 0 points to projects which would reduce no pollution; with straight-line interpolation between. *Source: sponsor estimates of VMT reduction from estimates of use, trip length, and prior mode.*
Overmatch	0-12	Based on providing *above* the minimum 20 percent local funding match: 12 points will be awarded to projects with local match of 50 percent or more; 0 points to projects with the minimum 20 percent local match; with straight line interpolation between.
Metro Vision project-related implementation and strategic corridor focus	0-14	Up to 14 points will be awarded as described in Appendix F.
Metro Vision sponsor-related Implementation	0-12	Up to 12 points will be awarded for sponsor actions implementing Metro Vision. Appendix G explains the specific criteria.
Total	**100**	

Table 10
Bicycle/Pedestrian Projects

Eligibility Requirements (All Projects)

1. Pedestrian and bicycle projects must be on facilities contained in an **adopted** local or regional plan.
2. Any new or reconstructed pavement must be designed and constructed to withstand occasional vehicle travel (emergency vehicles).
3. If project consists of multiple, non-contiguous elements, all elements must either be a) on the same facility (primary corridor) OR b) within ¼ mile of the largest element of the project.
4. Projects that consist of both a new construction element and an upgrade and/or reconstruction element must be categorized as either one or the other to score the project. That categorization is determined by the element proposed in the largest contiguous segment of the project, based on linear feet.

Eligibility Requirements (New Construction Projects Only)

5. New construction projects are defined as projects that will result in a new facility where pedestrian and/or bicycle infrastructure does not currently exist.
6. New construction projects must accomplish connectivity. Examples of connectivity include, but are not limited to:
   - Closing a gap between two existing bicycle facility sections
   - Improving access to transit
   - Providing pedestrian and bicycle facilities connecting to schools, parks, shopping, and/or employment
   - Eliminating barriers
   - Linking a bicycle facility to a 2035 Metro Vision RTP roadway that serves bicyclists

Eligibility Requirements (Upgrade/Reconstruction Projects Only)

7. Upgrade construction projects are defined as projects that are an upgrade or operational enhancement to an existing facility that does NOT currently meet ADA/AASHTO design standards.
8. Reconstruction projects are defined as projects that reconstruct the total pavement of a facility due to pavement deterioration.
9. For a project to be proposed as a pavement reconstruction project, the Pavement Condition Index, computed according to the methods in Appendix H, must have a PCI score 25 or less for asphalt surfaces and/or 35 or less for concrete surfaces AND the original pavement must be more than 20 years old.

Evaluation Criteria	Points	Scoring Instructions
		EVALUATION CRITERIA FOR ALL PROJECTS
Project Type	0-3	• 3 points will be awarded for new construction projects • 0 points will be awarded for upgrade and/or reconstruction projects on existing facilities

Table 10 (cont.)
Bicycle and Pedestrian Projects

Evaluation Criteria	Points	Scoring Instructions
RTP Priority Corridors	0-4	If project consists of multiple elements not all on the same corridor, scoring in this category will be based on the largest contiguous element. Score 4 points maximum: • 4 points will be awarded for bike projects that are on Regional Bicycle Corridors in the Pedestrian and Bicycle Element of the 2030 Metro Vision RTP (Figure 19 of that document or within ¼ mile of AND fulfilling the function of the facility depicted on Figure 19) • 3 points will be awarded for bike projects on Community Bicycle Corridors in that element (Figure 19 of the noted document or within ¼ mile of AND fulfilling the function of the facility depicted on Figure 19) • 1 point will be awarded for bike projects on an adopted local plan OR • 4 points will be awarded for pedestrian projects along 2035 Metro Vision RTP major regional arterials (assume Figure 32 of the 2030 Metro Vision RTP document as default) or within 1/8 mile of AND fulfilling the function of the facility depicted on Figure 32 • 3 points will be awarded for pedestrian projects along 2030 Metro Vision RTP principal arterials (Figure 32 of the 2030 Metro Vision RTP document as default) or within 1/8 mile of AND fulfilling the function of pedestrian movement for the facility depicted on Figure 32 • 1 point will be awarded for pedestrian projects on a corridor on an adopted local plan
User Base	0-8	Up to 8 points will be awarded based on the estimated user base of a project as follows: projects with a user base of 50,000 or more will receive 8 points; projects with a user base of 2,000 or less will receive 0 points; with straight line interpolation between. *Source: the project's user base is the combined sum of the DRCOG 2015 traffic analysis zone (TAZ) population and employment estimates within a 1.5 mile radius of the project area for a bicycle project and within a 0.5 mile radius for a pedestrian project, except where applicants can document an alternate user base for the project.* *For projects with non-contiguous elements, sponsors will compute the user base for each element. The project's overall user base is the weighted average based on the percent of the project length in each element compared to the overall length.*
Cost-effectiveness	0-8	Based on the user base calculated above: projects with a total cost per user base below $2 will receive 8 points; projects with a total cost per user base above $50 will receive 0 points; with straight line interpolation between.
Overmatch	0-12	Based on providing *above* the minimum 20 percent local funding match: 12 points will be awarded to projects with local match of 50 percent or more; 0 points to projects with the minimum 20 percent local match; with straight line interpolation between.

Table 10 (cont.)
Bicycle and Pedestrian Projects

Evaluation Criteria	Points	Scoring Instructions
Project-related Metro Vision implementation and strategic corridor focus	0-14	Up to 14 points will be awarded as described in Appendix F.
Sponsor-related Metro Vision Implementation	0-12	Up to 12 points will be awarded for sponsor actions implementing Metro Vision. Appendix G explains the specific criteria.
Total	**61**	

Evaluation Criteria	Points	Scoring Instructions
		EVALUATION CRITERIA NEW CONSTRUCTION PROJECTS ONLY
Safety	0-10	Projects will be evaluated on the anticipated *improvement* of existing safety problems to be made by building new facilities for non-motorized travel. Three measures of safety improvement will be awarded: **1. Relevant crash history** Based on the number of *documented* injury accidents: o created by the interaction between motorized and non-motorized traffic; o in the area to be affected by the proposed new facility; and o occurring over the last three-year period for which data is available. 1 point will be awarded for each applicable injury accident, up to a maximum of 4 **2. Conflict factor** If the existing facilities are roadways that allow interaction between motorized and non-motorized traffic, and if the project will build new facilities for the non-motorized traffic, to eliminate or reduce the conflict factor, the project will earn safety points. Based on the speed limit on the existing facilities, up to 4 points will be awarded as follows: • 1 points will be awarded if the existing speed limit is 30 MPH or less; • 2 points will be awarded if the existing speed limit is 35 MPH; • 3 points will be awarded if the existing speed limit is 40 MPH; or • 4 points will be awarded if the existing speed limit is 45 MPH or above. **3. Facility lighting** 2 points will be awarded to projects that will provide ADA/AASHTO compliant lighting to facilitate non-motorized travel on the planned facilities, if no lighting is currently available.

Table 10 (cont.)
Bicycle and Pedestrian Projects

Evaluation Criteria	Points	Scoring Instructions
Connectivity	0-17	Up to 17 points will be awarded for specific project attributes that address existing local or regional connectivity of non-motorized travel. Points will be awarded as follows: **Connectivity measures - gap closure (score points for only one of these two)** • 4 points - completely closing a gap between two existing bicycle facility/sidewalk sections • 2 points - completely closing a gap between an existing pedestrian/bicycle facility and an RTP roadway that serves pedestrian/bicyclists **Connectivity measures - access (score points for only one of these three)** • 3 points - provide direct access (project directly touching) to a school • 2 points - provide direct access (project directly touching) to an employment center with greater than 2,000 jobs • 1 points - provide direct access (project directly serving) to such destinations as employment, shopping, dining, or government buildings, or recreational destinations such as parks or recreational facilities **Connectivity measures - barrier elimination (score points for only one of these three)** • 5 points - entirely eliminate a barrier (railway, highway, waterway) for pedestrians or cyclists by grade separating • 3 points - entirely eliminate a barrier (railway, highway) for pedestrians or cyclists by providing a controlled crossing where one does not currently exist (demonstrate achievement of signal warrant if signal proposed) • 1 point - construct at least one phase of a multi-phase improvement (as dictated through an approved plan) towards eliminating a barrier (railway, highway, waterway) **Connectivity measures - transit (score points for only one of these if applicable)** • 3 points - provide new direct access to "transit" within 1.5 miles for bike projects and within 0.5 miles for pedestrian projects. "Transit" is stations, park-n-Ride lots, or transit terminals existing, in final design, or under construction; or existing bus stops serving 3 or more routes • 1 point - provide new indirect access (serving via an existing linkage) to "transit" within 1.5 miles for bike projects and within 0.5 miles for pedestrian projects. "Transit" is stations, park-n-Ride lots, or transit terminals existing, in final design, or under construction; or existing bus stops serving 3 or more routes

Table 10 (cont.)
Bicycle and Pedestrian Projects

Evaluation Criteria	Points	Scoring Instructions
Connectivity (cont.)		**Connectivity Measures – location (score 2 points maximum)** • 2 points – project is located in the jurisdiction of more than one local governmental entity (with written confirmation and agreement by the other affected governmental entities besides the applicant) • 1 point – project connects 2 or more neighborhoods where an exclusive bicycle and/or pedestrian access does not currently exist, excluding roadways.
Multiple enhancements	0-4	Up to 4 points will be awarded for multiple enhancements (score all that apply): • 2 points if project will provide facilities for bidirectional use by both bicycles and pedestrians (10 ft. minimum width) • 1 or 2 points if project will provide bicycle lockers or racks; 1 point for each 10 racks or 3 lockers, up to 2 points
Air Quality Benefits	0-8	New bike/ped projects may reduce air pollution by reducing VMT. Based on the daily reduction in pounds of total air pollutants expected from this project, as a percentage of the regional total from mobile sources, 8 points will be awarded to projects which would reduce 0.3% of the regional total or more; 0 points to projects which would reduce no pollution; with straight-line interpolation between. *Source: sponsor estimates of VMT reduction from estimates of use, trip length, and prior mode.*
Total	**39**	

Table 10 (cont.)
Bicycle and Pedestrian Projects

Evaluation Criteria	Points	Scoring Instructions
		EVALUATION CRITERIA UPGRADE/RECONSTRUCTION PROJECTS ONLY
Safety	0-14	Projects will be evaluated on the anticipated *improvement* of existing safety problems to be made by upgrading or reconstructing the facilities for non-motorized travel. Three measures of safety improvement will be awarded: **1. Relevant crash history** Based on the number of *documented* injury accidents: o created by the interaction between motorized/non-motorized traffic or non-motorized/ non-motorized traffic; o on or at the facility; and o occurring over the last three-year period for which data is available. 1 point will be awarded for each applicable injury accident, up to a maximum of 4 **2. ADA/AASHTO Standards (score for all that are applicable)** If the existing facilities do not meet current ADA and/or AASHTO design standards, up to 2 points per improvement will be awarded if the project includes provisions to do the following and upgrade the facility to meet ADA and/or AASHTO requirements: • 2 points will be awarded if an existing facility currently has an 8% or greater grade over 300 feet and is reduced to a grade of 5% or lower • 2 points will be awarded if a current narrower trail or path will be increased to a 10 foot or greater width to allow for bidirectional multi-purpose use • 2 points will be awarded if substandard radii are improved to meet AASHTO standards • 2 points will be awarded if substandard sight distance is improved to comply with AASHTO standards **3. Facility lighting** 2 points will be awarded to projects that will add ADA/AASHTO compliant lighting to facilitate non-motorized travel on the planned facilities, if lighting is not currently available.
Connectivity	0-13	Up to 13 points will be awarded for specific project attributes that address existing local or regional connectivity of non-motorized travel. Points will be awarded as follows: **Connectivity measures - access (score points for only one of these three)** • 3 points – provides upgraded access (to ADA/AASHTO standards) to a school • 2 points - provides upgraded access (to ADA/AASHTO standards) to an employment center with greater than 2,000 jobs • 1 point - provides upgraded access (to ADA/AASHTO standards) to such destinations as employment, shopping, dining, or government buildings, or recreational destinations such as parks or recreational facilities

Table 10 (cont.)
Bicycle and Pedestrian Projects

Evaluation Criteria	Points	Scoring Instructions
Connectivity (cont.)		**Connectivity measures - barrier elimination (score points for only one of these four)** • 5 points - entirely eliminate an existing barrier (railway, highway, waterway) for pedestrians or cyclists by grade-separating • 3 points - entirely eliminate an existing barrier (railway, highway) for pedestrians or cyclists by providing a controlled crossing where one does not currently exist (demonstrate achievement of signal warrant if signal proposed) • 2 points - improvements upgrade the non-motorized facility geometrics/traffic control to meet ADA and/or AASHTO requirements where the facility intersects at-grade with motorized vehicle traffic • 1 point - construct at least one phase of a multi-phase improvement (as dictated through an approved plan) towards eliminating a barrier (railway, highway, waterway) **Connectivity measures - transit (score points for only one of these if applicable)** • 3 points – reconstruct or upgrade (to make it ADA/AASHTO compliant) <u>direct</u> access to "transit" within 1.5 miles for bike projects and within 0.5 miles for pedestrian projects. "Transit" is stations, park-n-Ride lots, or transit terminals existing, in final design, or under construction; or existing bus stops serving 3 or more routes • 1 point - reconstruct or upgrade (to make it ADA/AASHTO compliant) <u>indirect</u> access (serving via an existing linkage) to "transit" within 1.5 miles for bike projects and within 0.5 miles for pedestrian projects. "Transit" is stations, park-n-Ride lots, or transit terminals existing, in final design, or under construction; or existing bus stops serving 3 or more routes **Connectivity Measures – location (score 2 points maximum)** • 2 points – project that is being reconstructed or upgraded (to make it ADA/AASHTO compliant) is located in the jurisdiction of more than one local governmental entity (with written confirmation and agreement by the other affected governmental entities besides the applicant) • 1 point – facility that is being reconstructed or upgraded (to make it ADA/AASHTO compliant) connects 2 or more neighborhoods where an exclusive bicycle and/or pedestrian access does not currently exist, excluding roadways.
Multiple enhancements	0-4	Up to 4 points will be awarded for multiple enhancements (score all that apply): • 1 point if the project will provide new or additional amenities for facility users (benches, fountains, directional or distance signage, restrooms, etc.) • Up to 3 points if project will provide additional bicycle lockers or racks to what already exists; 1 point for each 10 racks or 3 lockers, up to 3 points

Table 10 (cont.)
Bicycle and Pedestrian Projects

Evaluation Criteria	Points	Scoring Instructions
Existing Users	0-8	Based on current recorded use, facilities with 450 users or more during the AM 2-hour peak will receive 8 points; facilities with 50 users or less during the AM 2-hour peak will receive 0 points; with straight line interpolation between. Users are to be counted at a representative location in the project area. *Source: Actual count from applicant between 7am and 9am on a Tuesday, Wednesday, or Thursday between August 7 and August 23, 2007*
Total	**39**	

Table 11
Other Enhancement Projects

Eligibility Criteria
Any other transportation-related projects meeting FHWA eligibility rules, as outlined in Appendix B.

Evaluation Criteria	Points	Scoring Instructions
Benefit	0-32	Score up to 32 points total for the category that best fits your project: ***Transportation-Related Historic Preservation / Archaeological Projects*** *will be awarded:* • 16 points if this project is part of a local, regional, or state preservation or archaeological effort. • 8 points if this project positively affects the regional transportation system (see 2035 Metro Vision RTP). • 8 points if this project is a good use of public dollars. The economic benefits (i.e., revitalization of tourism and/or reduction in public and private expenditures) must be quantified. ***Transportation Aesthetics and Scenic Values Projects*** *will be awarded:* • 8 points if this project is part of the state's scenic highway program. • 8 points if this project removes a visual blight. • 8 points if the project enhances the visual environment. • 8 points if this project is a good use of public dollars. The economic benefits must be quantified. ***Projects which Mitigate Water Pollution due to Highway Runoff*** *will be awarded:* • 16 points for a project which implements mitigation measures identified in the Colorado Department of Health Non-Point Source Management Program and/or DRCOG Clean Water Plan for a demonstrated water quality problem. • 8 points if evidence is provided that the proposed mitigation will improve water quality, preserve wetlands, or create new ones. • 8 points if this project is a good use of public dollars. The economic and environmental benefits must be quantified.
Cost-effectiveness	0-30	All projects in this category will be compared by their cost per benefit point calculated above: projects with a total cost per benefit point below $8,000 will receive 30 points; projects with a total cost per benefit point above $80,000 will receive 0 points; with straight line interpolation between.
Overmatch	0-12	Based on providing *above* the minimum 20 percent local funding match: 12 points will be awarded to projects with local match of 50 percent or more; 0 points to projects with the minimum 20 percent local match; with straight line interpolation between.
Project-related Metro Vision implementation and strategic corridor focus	0-14	Up to 14 points will be awarded as described in Appendix F.
Sponsor-related Metro Vision Implementation	0-12	Up to 12 points will be awarded for sponsor actions implementing Metro Vision. Appendix G explains the specific criteria.
TOTAL	**100**	

Table 12
Air Quality Improvement Projects

Eligibility Criteria

CMAQ-eligible transportation-related air quality improvement projects (see Appendix A). All submitted funding requests must provide an estimate of air pollutant emissions reduction. TDM, ITS, and signal system/coordination projects eligible for funding in specific pools (see Section III.E) are ineligible to be submitted as funding requests in the TIP process. Pedestrian/bicycle, rapid transit, HOV, new bus service, roadway operations, and study funding requests should be submitted in appropriate project types, not as air quality improvement projects.

Evaluation Criteria	Points	Scoring Instructions
Project Type	0-4	4 points will be awarded for diesel retrofit projects 0 points will be awarded for all other air quality improvement projects that are not diesel retrofit project
Benefit	0-29	*For projects which would indirectly reduce air pollution by reducing VHT or VMT or for projects which would directly address the reduction of multiple air pollutants:* Based on the daily reduction in pounds of *total* air pollutants expected from the project, as a percentage of the regional total from mobile sources, 29 points will be awarded to projects which would reduce greater than 0.3% of the regional total; 0 points to projects which would reduce no pollution; with straight-line interpolation between. *For projects which directly address reduction of a specific air pollutant (NOx, CO, PM2.5, PM10 or VOC):* Based on the daily reduction in pounds of any *single* pollutant as a percentage of the regional mobile source total from that pollutant: 29 points will be awarded to projects which would reduce above 0.3% of the regional total; 0 points to projects which would reduce no pollution; with straight-line interpolation between. ***Only* projects scoring at least one point for Benefit are eligible for funding under this project type.**
Cost-effectiveness	0-29	Based on the anticipated daily cost in dollars per pound of total daily air pollutant reduction expected over the life of the project in years: 29 points will be awarded to projects which would cost below $0.25 per pound; 0 points to projects which would cost above $1.00 per pound; with straight-line interpolation between.
Overmatch	0-12	Based on providing *above* the minimum 20 percent local funding match: 12 points will be awarded to projects with local match of 50 percent or more; 0 points to projects with the minimum 20 percent local match; with straight line interpolation between.
Metro Vision project-related implementation and strategic corridor focus	0-14	Up to 14 points will be awarded as described in Appendix F.
Metro Vision sponsor-related Implementation	0-12	Up to 12 points will be awarded for sponsor actions implementing Metro Vision. Appendix G explains the specific criteria.
Total	**100**	

Table 13
Studies

Eligibility Criteria

Only three types of studies are eligible for funding requests for the 2008-2013 TIP:

- **Roadway capacity project** studies to further project development for regionally-funded roadway widening, new road, new interchange, interchange reconstruction, and Bus/HOV/BRT projects identified in the adopted networks for testing for the fiscally constrained 2035 Metro Vision RTP (will be listed in Appendix D after adoption);
- **Operational improvement** studies to identify low-cost system management and operational improvements to reduce congestion on an arterial corridor (or portion thereof but not less than one mile in length) shown on the 2035 Metro Vision Regional Roadway System (assume Figure 32 of the 2030 Metro Vision RTP document as default); and
- Studies to further implementation of the fiscally constrained rapid transit system (assume Figure 33 of the 2030 Metro Vision RTP document as default). Such studies include the three types of station area planning studies described below.
  - Corridor-wide TOD workshops focusing on:
    - Maximizing both transit operations and TOD
    - Involving all the local jurisdictions and other major stakeholders
    - Completing a TOD action plan identifying, on a corridor basis, such things as needed plan updates, code revisions, and financial or regulatory incentives
  - Creation and adoption of a station area master plan (2020 horizon or beyond). The scope for such a study/plan **must include**:
    - Definition of station area activity focus (character, nature, typology)
    - Station area market study
    - Identification (map) of type and density of future land uses
    - Circulation plan(s) (maps) for motor vehicles, transit, bicycle and pedestrian modes
    - Identification (map) of pedestrian areas and characteristics
    - Public spaces plan (map)
    - Identification of the transportation impacts and air quality benefits of the proposed plan (CMAQ benefits reporting requirement)
    - Identification of land use and other actions necessary to accomplish the station area master plan
    - Active involvement by RTD and the public in the development of the plan
  - Additional studies to further the development of the station area if a station area master plan has already been adopted. Such “next step” studies are only eligible if they:
    - Are for planning activities that are clearly and unambiguously related to transportation infrastructure for use by the general public, AND
    - Are for planning/design activities that do not conflict with RTD planning/design activities as demonstrated by a letter of concurrence from RTD, AND
    - Total no more than $200,000 federal funds awarded for transportation-related planning activities at an individual station, aggregate (total of funds awarded for preparation of a master plan and any “next step” studies over ALL TIP cycles for which station area planning funds are awarded).

  No more than three stations can be included in any single funding request for a station area master plan or additional studies. Funding requests for corridor-wide workshops have no limit on number of stations. When multiple stations are included, all evaluation criteria refer to the average conditions for those locations. Corridor-wide TOD workshops and creation and adoption of an initial station area master plan are higher priorities than “next step” studies.

Table 13 (cont.)
Studies

Evaluation Criteria	Points	Scoring Instructions
		For roadway capacity project studies and operational improvement studies
Current congestion	0-20	Based on the degree of current (2006) congestion on the most congested segment of the project: 20 points will be awarded to projects with current congestion score of 20 or more; 0 points to projects with current congestion score of 0; with straight-line interpolation between. For studies for new roads or new interchange projects, congestion based on current travel paths. *Source: DRCOG congestion management program; sponsor may supply location-specific volume data to augment DRCOG data in computation of congestion score.)*
Usage	0-16	Based on estimated 2005 AWDT/lane of the major roadway (average for overall project length): projects with AWDT/lane of 17,000 or more will receive 16 points; projects with AWDT/lane of 5,000 or less will receive 0 points; with straight line interpolation between. *Source: DRCOG 2005 model (daily)*
Other criticality criteria	0-26	For **roadway capacity project studies:** A maximum of 15 points will be awarded based on the score computed by DRCOG for project consideration in the fiscally constrained 2035 Metro Vision RTP process: 15 points will be awarded if the project's long-range score was 75 or higher; 0 points will be awarded if the project's long-range score was 45 or lower; with straight line interpolation between. *Source: DRCOG* **AND** a maximum of 5 points will be awarded based on the CDOT inspection per the National Bridge Inspection Standards of the included structure, nearby structure, or structure on current travel path, and the resultant bridge sufficiency rating: 5 points will be awarded if the bridge sufficiency rating is 20 or lower; 0 points will be awarded if the bridge sufficiency rating is 80 or higher; with straight line interpolation between. *Source: DRCOG from CDOT* **AND** a maximum of 6 points will be awarded based on the project's current (2005) forecast cost per daily person-miles-of-travel (PMT): • **For Bus/HOV/BRT, roadway widening, and new road projects**: 6 points will be awarded to projects with a cost per PMT of $50 or less; 0 points to projects with a cost per PMT of $550 or more; with straight line interpolation between. • **For interchange reconstruction and new interchange projects**: 6 points will be awarded to projects with a cost per PMT of $250 or less; 0 points to projects with a cost per PMT of $2,750 or more; with straight line interpolation between. • PMT for new road and interchange projects based on modeled usage estimates. *Source: DRCOG 2005 model data (daily)* For **operational improvement studies:** A maximum of 20 points will be awarded based on the weighted crash rate of the study (area) corridor in comparison to the statewide average. Appendix E explains the point allocation. **AND** a maximum of 6 points will be awarded based on inclusion on the 2035 Metro Vision RTP Emphasis Corridors map (assume Figure 27 of the 2030 Metro Vision RTP document as default): 6 points will be awarded to freeway or major regional arterial corridors. 3 points will be awarded to emphasized principal arterial corridors.

Table 13 (cont.)
Studies

Evaluation Criteria	Points	Scoring Instructions
Overmatch	0-12	Based on providing *above* the minimum 20 percent local funding match: 12 points will be awarded to projects with local match of 50 percent or more; 0 points to projects with the minimum 20 percent local match; with straight line interpolation between.
Project-related Metro Vision implementation and strategic corridor focus	0-14	Up to 14 points will be awarded as described in Appendix F.
Sponsor-related Metro Vision implementation	0-12	Up to 12 points will be awarded for sponsor actions implementing Metro Vision. Appendix G explains the specific criteria.
TOTAL	**100**	

Table 13 (cont.)
Studies

Evaluation Criteria	Points	Scoring Instructions
		For station area planning studies
Current congestion	0-20	Based on the degree of current (2006) congestion on the nearby freeway segment (or major regional arterial for selected corridors): 20 points will be awarded to projects with current congestion score of 20 or more; 0 points to projects with current congestion score of 0; with straight line interpolation between. *Source: DRCOG congestion management program; sponsor may supply location-specific volume data to augment DRCOG data in computation of congestion score.)*
Ridership potential	0-10	Based on daily (average) 2030 station usage: 10 points will be awarded for productions/attractions of 2,000 or more; 0 points for productions/attractions of 0; with straight line interpolation between. *Source: DRCOG 2030 model data*
Existing station area land use, ownership, income, and ethnicity	0-32	A maximum of 6 points will be awarded based on the percentage of the study area that is brownfields: 6 points will be awarded if the study area is 30% or more brownfields; 0 points will be awarded if the study area is 0% brownfields; with straight line interpolation between. **AND** a maximum of 6 points will be awarded based on the number of different property owners within 1/4 mile of the station: 6 points will be awarded if there are 14 or more owners; 0 points will be awarded if there are 2 or fewer owners; with straight line interpolation between. **AND** a maximum of 10 points will be awarded based on the percentage of the study area that would be infill/redevelopment area as opposed to currently-undeveloped land: 10 points will be awarded if the study area is 50% or more infill/redevelopment; 0 points will be awarded if the study area is 0% infill/redevelopment (i.e., 100% currently undeveloped); with straight line interpolation between. **AND** a maximum of 10 points will be awarded based on the percentage of the study area in low income or minority areas (reference 2030 Metro Vision RTP Figure 34 as default): 10 points will be awarded if the study area is 40% or more low income or minority area; 0 points will be awarded if the study area is 0% low income or minority area; with straight line interpolation between.
Overmatch	0-12	Based on providing *above* the minimum 20 percent local funding match: 12 points will be awarded to projects with local match of 50 percent or more; 0 points to projects with the minimum 20 percent local match; with straight line interpolation between.
Project-related Metro Vision implementation and strategic corridor focus	0-14	Up to 14 points will be awarded as described in Appendix F.
Sponsor-related Metro Vision implementation	0-12	Up to 12 points will be awarded for sponsor actions implementing Metro Vision. Appendix G explains the specific criteria.
TOTAL	**100**	

APPENDIX E
ROADWAY SAFETY CRITERIA

Safety is an evaluation criterion for all roadway project types: roadway capacity improvements, operational improvements, and reconstruction. Safety is also a criterion for roadway operations studies. Of relevance in the point computation is one or both of the following (depending on project type):

- Current weighted crash rate (Rw) compared to the statewide average; and/or
- Estimated reduction in number of crashes.

Sponsors are encouraged to use qualified traffic personnel for the safety computations.

Current Weighted Crash Rate Comparison

To compute this measure, applicants will provide the following information in the DRCOG TIP funding request application form:

1. Roadway data

The applicant must provide the roadway type, rural/non-rural designation, safety computation area length, and average weekday traffic volumes (AWDT).

- The roadway type is either freeway or arterial.
- The urban/non-urban designation should be based on Figure E-1.
- **For all funding requests, the safety computation area must be at least one mile in length.**
- For new roadway projects, the roadway type, length, and volumes should be for the current travel path.
- For new interchanges (all of which are arterial-arterial intersection upgrades) and intersection operational improvements (and studies thereof), data should be provided for the primary roadway and the cross street (if applicable). The sum of the road leg distances must equal at least one mile. The minimum AWDT information to be provided is one count on each of the primary roadway and cross street; more desirable is one count on each leg. The roadway type reported should be for the primary roadway.
- For interchange reconstruction projects, the data provided should be for the interchanging arterial, not the freeway mainline (e.g., project type is arterial).

2. Number of crashes over three years

The applicant must supply the number of crashes by severity category over the three most recent years for which data is available. The severity categories are: fatal crashes, injury crashes and property damage only (PDO) crashes.

- The crashes should be tallied at all appropriate intersections, approaches, and road segments along the identified safety computation area length (minimum distance of one mile).

Estimated reduction in number of crashes

For all funding requests for roadway capacity projects, roadway operational improvements, and reconstruction projects, but NOT for roadway operations studies, the applicant is asked to estimate the potential reduction in number of crashes from the project. The estimates are used to determine levels (low, medium, high, very high) of improvement to award safety points. They are not meant to imply precise predictions of eliminated crashes. The reduction should be reported for a three-year period (similar to crash data provided).

- For new roadways, the number of crashes reduced shall be based on the reduction in volume on the current travel path due to the new roadway. In other words, [AWDT decrease/current AWDT] * [current number of crashes]. Source for volumes: DRCOG.
- For requests for other projects noted above, the estimated crash reductions should consider all individual elements of the project. Table E-1 presents Crash Reduction Factors that should be used to estimate crash reduction. It presents specific percentage reductions **for relevant crashes due to specific improvement elements**. Sponsors must document how the crash reductions were determined. Crash reduction factors must only be applied to specific sites along the project length and for relevant crash types. Total crash reduction estimates may not exceed 75 percent of the original three-year crash total. The professional judgment of qualified personnel will be necessary in the crash reduction determination process.

Safety Projects

The funding request application program will compute and award the safety points scored. The steps in the process are:

1. Calculate the weighted annual crash rate for the existing roadway(s) or intersection:

   From the entered volume, safety computation area length, and crash data, the program will calculate Rw as follows:

   Weighted Annual Crashes (Aw)
   A_w={(12)(#of fatal crashes)+(5)(#of injury crashes)+(#of PDO crashes)}/3

   Annual miles traveled on the subject segments of roadway(s), VMT:
   VMT=Average AWDT * length * 365 * .9277 (minimum length=1.0 mile)
   Average AWDT={sum of AWDT}/ number of counts

Weighted Annual Crash Rate, R_w (per million miles)
$R_w = A_w / (VMT/10^6)$

2. Identify the crash range

Using the computed weighted annual crash rate (R_w), the roadway type and urban/non-urban designation, and the statewide averages displayed in the following table, the funding request application program will assign the appropriate crash range (row A, B, C, or D in the left column).

	R_w (weighted annual crash rate per Million Vehicle Miles of Travel) by Roadway Type			
	Non-rural Arterial	Non-rural Freeway	Rural Arterial	Rural Freeway
Crash Range	R_w			
A <State Average	0.01 to 7.49	0.01 to 3.85	0.01 to 3.02	0.01 to 2.26
B 1-2x State Average	7.5 to 14.94	3.86 to 7.7	3.03 to 6.04	2.27 to 4.52
C 2-3x State Average	14.94 to 22.38	7.8 to 11.64	6.05 to 9.06	4.532 to 6.78
D >3x State Average	22.39+	11.65+	9.07+	6.79+

Source: DRCOG from CDOT data for 2003 and 2004.

3. Identify the estimated crash reduction level (as applicable)

Using the estimated number of crashes reported by the applicant for the three-year period, the funding request application program will convert that to a per-mile basis (using the safety computation area length) and will assign the crash reduction level as follows:

- Low (9 or fewer crashes eliminated per mile)
- Medium (10-19)
- High (20-29)
- Very High (30 or more).

If no data is provided by the applicant, the low crash reduction level will be assigned.

4. Award the safety points

The following four tables show the number of safety points the funding request application program will award, based on the estimated crash reduction level and the crash range.

- Roadway Capacity Projects

Because the long-range plan score criterion was computed in part based on current weighted crash rates, the points available are based primarily on the estimated crash reduction level.

Roadway Capacity Projects	Estimated Crash Reduction Level			
	Low	Medium	High	Very High
Crash Range	Safety points to be awarded			
A & B	0	1	3	4
C & D	1	3	4	5

- Roadway Reconstruction Projects

Roadway Reconstruction Projects	Estimated Crash Reduction Level			
	Low	Medium	High	Very High
Crash Range	Safety points to be awarded			
A	0	0	1	2
B	0	1	2	3
C	1	2	3	4
D	2	3	4	5

- Roadway Operations Projects

Roadway Operations Projects	Estimated Crash Reduction Level			
	Low	Medium	High	Very High
Crash Range	Safety points to be awarded			
A	0	1	3	4
B	1	2	4	5
C	2	4	5	6
D	3	5	6	7

- Roadway Operations Studies

For studies, the crash reduction level is not estimated and the points are awarded based entirely on crash range.

Roadway Operations Studies	
Crash Range	Safety points to be awarded
A	0
B	7
C	14
D	20

Table E-1
DRCOG TIP Project Evaluation Safety Criteria
Sample Suggested Crash Reduction Factors

Improvement Characteristics	Percentage Reduction in Relevant Crashes (at applicable crash locations)	Example Relevant Crash Types
Intersections		
New traffic signal	20%	right-angle, turns
Upgrade traffic signal (heads)	20%	rear-end, red light run
Add new approach turn lanes (either left or right)	25%	rear-end
Add accel/decel lane	25%	rear-end, sideswipe
Convert to roundabout	40%	right-angle
Convert to interchange	40%	right-angle
Increase turn radii	15%	turn crashes
Railroad		
Automatic gate	75%	vehicle-train
Grade separate	100%	vehicle-train, rear-end
Roadside/Bridges		
Guardrail-install/upgrade	60% fatal, 40% injury	run off road
Shoulder widening/addition	20%	run off road, overtake ped/bike
Bridge widening	40%	bridge
Remove fixed objects	50% fatal, 15% injury	fixed object
Separated bicycle/pedestrian path	80%	overtake ped/bike
Roadways		
Curve reconstruction	50%	run off road, head-on
Vertical realignment	45%	head-on, limited sight
Median barriers	60% fatal, 10% injury	head-on
Raised median	40%	turn crashes, turn-related rear-ends
Climbing/passing lane	15%	passing, rear-end
Lane widening	20%	sideswipe (multi-lane)
Ramp geometric reconstruction	25%	ramp
Widen from 2-lane to 4-lane road	30%	rear-end, head-on
Continuous center-left turn lane	30%	rear-end
Shoulder rumble strips	80%	run off road
Pave shoulder to full width	10%	run off road
Other		
Lighting improvement	90%	night-time crashes
Close median opening	30%	turn crashes

Notes:

1. Crash reduction factors are for TIP project scoring guidance only.
2. The factors are not meant to imply precise predictions of eliminated crashes.
3. Rates should be applied only to specific applicable sites within the project area.
4. Rates should only be applied to relevant crash types addressed by the improvement.
5. Do not double-count similar improvement types or eliminated crashes.
6. Crash reduction factors may be applied to improvement and crash types not shown on this table; however, applicant must provide justifying documentation.

APPENDIX F
PROJECT-RELATED METRO VISION IMPLEMENTATION
AND STRATEGIC CORRIDOR FOCUS

Urban Centers (score points as applicable, for only one of the three) Project is entirely within an urban center shown on the adopted Metro Vision 2030 Plan Figure 9, or is within proximity of and helps support the functioning of the urban center by directly or indirectly serving it (definitions below): • 6 points if Denver Central Business District (CBD) urban center • 5 points if other urban center with fixed guideway transit station included in fiscally constrained 2030 Metro Vision RTP • 3 points if other urban center • 0 points if not serving an urban center
Urban Growth Boundary/Area (UGB/A) • 3 points if the project is at least 90% contained within the established UGB of a UGB community or the "committed area" of a UGA community • 1 point if the project is at least 40% contained within the established UGB of a UGB community or the "committed area" of a UGA community
Denver International Airport (DIA) (score points if applicable) • 1 point if project is in or within one-half mile of airport boundary and provides convenient access to DIA
Strategic Corridors (score points if applicable, for only one of the two) Project is entirely on a strategic corridor shown on Figure F-1 (including relevant rapid transit lines), or is within proximity of and helps support the functioning of the strategic corridor by directly or indirectly serving it (definitions below): • 4 points if two or more strategic corridors • 2 points if one strategic corridor

Definitions:

- Directly serving = physically touching
- Indirectly serving = serving via an existing or included-in-the-project linkage
- Proximity (measured as crow flies)
    - For pedestrian projects: within one-half mile of urban center outer boundary; within one-half mile of fixed guideway transit station platform location in strategic corridor.
    - For bicycle projects: within one and one-half miles of urban center outer boundary; within one and one-half miles of fixed guideway transit station platform location in strategic corridor.
    - For bus service projects: must directly serve urban center or directly serve fixed guideway transit station platform location or use HOV/BRT guideway in strategic corridor.
    - For roadway, studies, or other enhancements, and air quality improvement projects: within three-quarters of a mile of urban center outer boundary; within three-quarters of a mile of the centroid of a freeway interchange or major intersection (if not freeway) or fixed guideway transit station platform located in strategic corridor.

APPENDIX G (cont.)
SPONSOR-RELATED* METRO VISION IMPLEMENTATION CRITERIA

Evaluation Criteria	Points Each	Scoring Instructions
PM_{10} conformity commitment (for communities that **were** asked to make a conformity commitment)	Up to 4	If the sponsor or project's local jurisdiction has made a conformity commitment for the horizon year in the RTP (2035) that exceeds: • 30 percent reduction, award 1 point. • 45 percent reduction, award 2 points. • 55 percent reduction, award 3 points. If the sponsor or project's local jurisdiction is meeting its 2015 conformity commitment in current practice, award 1 additional point to the PM_{10} points scored above. The survey of past performance conducted annually in June by the RAQC will be compared to the conformity commitments assembled for the 2035 RTP conformity.
Current practice (for communities that were **not** asked to make a PM_{10} conformity commitment)	Up to 4	Based on the survey of past performance conducted annual in June by the RAQC, if the sponsor or project's local jurisdiction has a current practice that exceeds: • 30 percent reduction, award 1 point. • 45 percent reduction, award 2 points. • 55 percent reduction, award 4 points.
Total Points Possible	**12**	

* or the project location's jurisdiction

Sacramento Area Council of Governments (SACOG)

PROJECT SELECTION PROCESS

[The following process applies to Sacramento, Yolo, Yuba, and Sutter Counties, but not to Placer and El Dorado Counties.]

Applications for Air Quality projects in Sacramento and Yolo Counties must be presented as information to the countywide transportation agency in those counties. Because there are no countywide transportation agencies in Yuba and Sutter Counties, this step is not necessary. The Air Quality Working Group and a Grant Overview Committee, formed from existing SACOG committees and staffed by SACOG, will make recommendations to the Board of Directors, through the appropriate Board Committee, on project selection. After SACOG staff screen project applications for eligibility, Working Group and Grant Overview Committee members will be responsible for reading applications and making recommendations for projects to be funded. Appendix E provides more detail on the process and the membership of these committees.

SACOG reserves the right to fund less than the amount reserved for each funding program in a given funding cycle, as well as to fund projects in a program other than the one for which it was submitted.

IMPLEMENTATION

After SACOG has awarded a grant, project sponsors will be asked to follow or be aware of these requirements:

- Follow all federal funding requirements listed in Appendix D.
- Follow all federal environmental justice directives.
- Assure SACOG that the projects meet the requirements of the Americans with Disabilities Act.
- Follow SACOG's "Use It or Lose It" policy for obligating and spending the grant funds. The policy requires project sponsors to schedule fund obligation and project implementation in the *Metropolitan Transportation Improvement Program* and to honor that schedule.
- A local non-federal match of at least 11.47% of the total cost of a project is required for projects receiving federal funding in the Sacramento region, with a few exceptions that are detailed under the individual program guidelines. This does not include "in kind"

match, but must be funding that is dedicated to eligible features within the project and included in its overall cost.

- For capital projects, federal funds may be used for Preliminary Engineering (which includes environmental work and design) as well as for right-of-way and construction. When a project is ready for implementation, the project sponsor requests an authorization from Caltrans. When the project is authorized, the sponsor can incur expenses that will then be reimbursed from the grant. A project sponsor submits invoices for the entire cost incurred, and will be reimbursed at 88.53% (the total cost minus local match).

- SACOG encourages project sponsors to seek other sources of funding that may be available, including Community Development Block Grants or other federal HUD funds (although for the most part, federal funds from other programs cannot be used as match).

FUNDING PROGRAM GOALS, ELIGIBLE PROJECT TYPES, AND PROJECT EVALUATION

Background and Program Goal

The SACOG region currently holds a non-attainment status for ozone under federal air quality laws. Because the region must meet stringent federal air quality in the *upcoming Rate of Progress State Implementation Plan for Air Quality*, (or SIP) SACOG will place highest priority on the selection of cost-effective transportation projects that contribute the most to reaching attainment.

When there is a new SIP based on the eight-hour standard, expected in 2007, this air quality funding program could be used to directly implement the mobile-source measures in that plan.

Eligible Project Types

The Air Quality Program will fully or partially fund projects in the following categories, first applying screening criteria to qualify potential projects. The project must meet all of the screening criteria.

A. **Projects that provide real, permanent[4] and quantifiable on-roads emissions reductions for the region**. Examples are gross-polluting vehicle replacement programs, bus demonstration projects, and alternative-fuel buses.

Screening Criteria

- The project results in claimable emissions reductions.

[4] The definition of "permanent" used by the Environmental Protection Agency is "that the emission reduction occurs throughout the life of the measure, and for as long as it is relied upon in the State Implementation Plan."

B. **Air quality improvement plans**
For example, State and Federal air quality plans.

Screening Criteria

- Funding of the appropriate type is available for this purpose.
- Air quality planning activities proposed are related to analysis and assessment of control measures for on-road vehicle emissions or emissions from road construction vehicles.
- There is inadequate funding from other sources to prepare legally required air quality plans by mandated deadlines.

C. **Public awareness and educational campaigns**
An example would be the Spare the Air campaign

Screening Criteria

- The program has an established track record in this region or in another region or offers the potential of significantly contributing to a reduction in emissions.
- The program is eligible for credit under the Environmental Protection Agency's Economic Incentive Program.

Project Evaluation

Projects will be evaluated using the criteria shown below with other appropriate criteria that may be added.

For all projects

- Air quality benefits
- Project costs (see Note 1)
- Project lifecycle costs (see Note 1)
- Air quality cost effectiveness (see Notes 1 and 2)
- Length of time to implement and see results
- Air quality impacts of not funding project or plan
- Added priority (see Note 3)
- Other policy considerations

For plans

- The relevance and significance of the planning activities to the region's submission of a legally valid and technically sound air quality plan in compliance with Federal laws.

For buses

- Projected ridership and average trip length

- For bus replacements, the potential impacts of not replacing the buses (such as function of the transit system and regional network, ridership, and shifts from or to driving or other modes of transportation).

Notes

1. The definition of "cost" is that part of the total cost of the project intended to be funded with this program. There is an 11.47% local match required for using these funds, but additional match funding can be applied.
2. Evaluation of benefits and cost-effectiveness require the use of Air Resources Board or Environmental Protection Agency methodologies. In the absence of an ARB or EPA accepted methodology, SACOG will rely on methodologies recommended by the Air Districts of the region.
3. Added priority is given to projects that
   - are time critical for meeting state or federal air quality mandates.
   - in addition to reducing ozone precursors also reduce particulate matter.

H. PROJECT EVALUATION

Screening criteria

To be selected for funding, a project or program must meet both of the following screen criteria:

a. It is included in the *Regional Bicycle, Pedestrian, and Trails Master Plan* as a "high" priority project. "Medium" priority projects will be considered if not enough "high" priority projects are ready for inclusion as described below, or if the delivery of a "high" priority project as been significantly delayed or has become infeasible. Under very special circumstances, applications may be considered that are not listed in the *Master Plan* or are listed as low or medium priority.

b. It must be ready for inclusion into the *Metropolitan Transportation Improvement Program*, with project scope and cost. The project application may include the cost of preparing environmental documents. However, for large projects that will necessitate a full Environmental Impact Statement (EIS), the EIS can be funded separately from the design and construction of the project (which should seek funding in a later round of funding).

Ranking criteria

In Sacramento, Yolo, Yuba, and Sutter Counties, projects to be funded will be chosen from the list of high priority projects included in the *Master Plan.* The Bicycle and Pedestrian Working Group will rank projects based on the following criteria, with a maximum of 100 points, and 10 additional bonus points possible. The Working Group will also take other considerations into account. The rankings will be used to determine which of the high priority projects will be funded.[1]

Ranking criteria

1. Meets capital or non-capital program goals: How many of the goals the project/program addresses and how well? (60 points)
2. Cost effectiveness: The ratio of items 2a. and 2b. below (20 points)
   a. Project costs and lifecycle costs. For analysis, all costs should be computed to present value.
   b. Quantifiable and qualitative project benefits, including safety improvement, time savings, air quality benefits, and increases in usage by bicyclists and pedestrians.
3. Strength of commitment, degree of risk to cost and schedule, relative priority at local jurisdiction(s). (20 points)
4. Bonus - Extra local match provided. (10 points maximum, 1 point for each 5% of additional local match beyond the required 11.47%)

[1] Placer and El Dorado County projects are ranked in the Master Plan to serve as guidelines for the respective jurisdictions and do not indicate a priority relative to projects in Sacramento, Yolo, Yuba, and Sutter Counties. See Appendix C for details on project selection in those counties.

Other Considerations

Other factors SACOG will take into consideration when ranking projects are:

- Capital projects that support Blueprint implementation will be given priority over non-capital projects and programs, although up to 10% of the funding in a round may be used for non-capital projects.
- Project is closely related to local activity center/compact development area, and identified in the local general plan, that will be implemented soon but is beyond what is required of the developer to pay for.
- A bicycle or pedestrian project located in an undeveloped area that connects two developed areas with good circulation.
- Projects that benefit both public transit or roadways and bicycling/walking may be funded partially from this funding source with the expectation that transit or roadway funding sources will pay for the remainder.
- The same type of program or project has been implemented successfully elsewhere.

Appendix E1

Summary of Technical Survey Results

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Figure 16 - Average Weighting Factor Preference for “Transit” Evaluation Criteria 10

Figure 17 - Relative Importance of “Intermodal” Evaluation Criteria 10

Figure 18 - Average Weighting Factor Preference for “Intermodal” Evaluation Criteria 11

Appendix E1 – Technical Weighting Factor Survey Process and Results

Given the fast track schedule, the TWFS was made available for one full week from September 17 through September 24, 2009. In that time, 36 surveys were completed, including representation from most agencies (see **Figure 1**). Approximately 47 percent of the respondents were city representatives, with another 47 percent from a combination of VDOT, HRTPO, and Kimley-Horn. The remaining 6 percent consisted of individuals from HRT, VPA, and the Virginia Modeling and Simulation Center (VMASC).

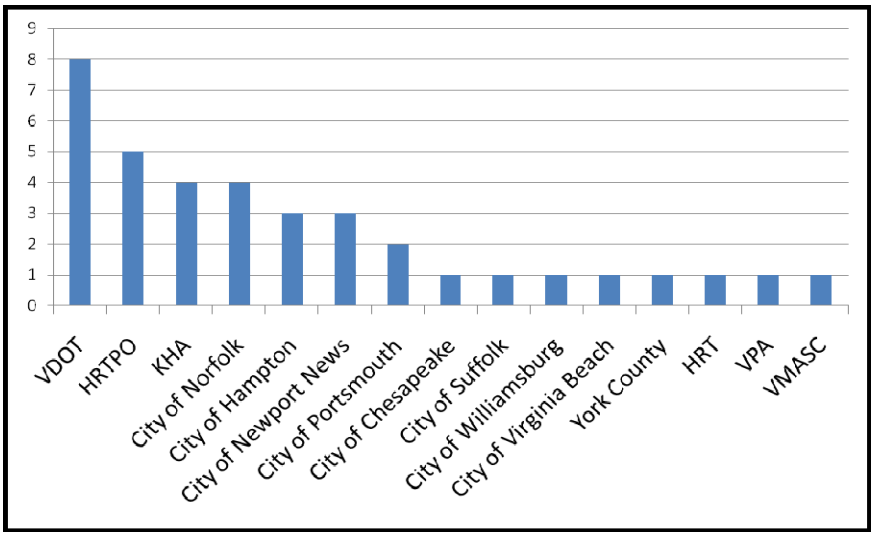


Figure 1 - Technical Survey Respondents (by Agency)

Based on the information provided by the participants, approximately 22 percent have lived in Hampton Roads for less than five years while approximately 75 percent have resided in the region for more than ten years (see **Figure 2**).

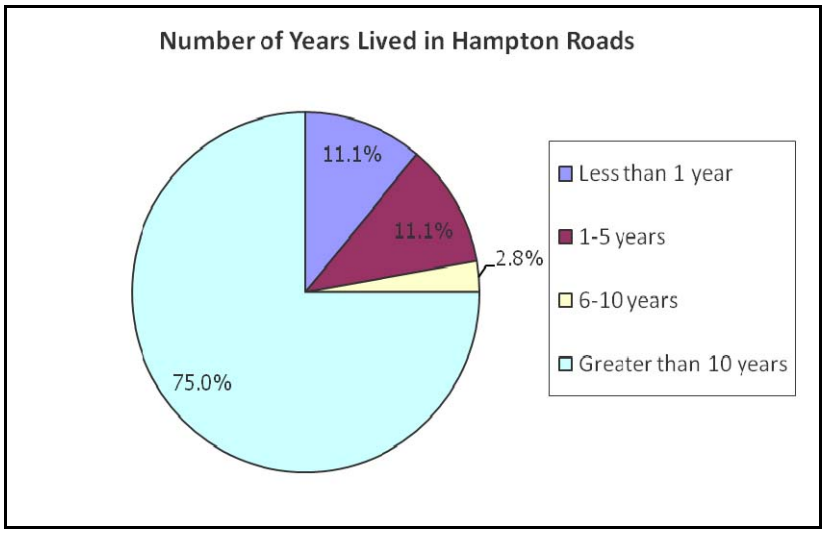


Figure 2 - Technical Survey Respondents (by Years of Residency)

When observing the types and frequency of transportation modes used (**Figure 3**), it is clear that the dominant mode of transportation used by the Technical Survey participants is the personal automobile,

which is used by approximately 91 percent of the respondents on a daily basis. It also is evident that Carpool/Vanpool/Public Transit and Bicycle are not currently frequently used modes. Walking, however, was observed to be relatively equal between all frequencies of use with the understanding that many respondents chose to walk for non-commuter trips.

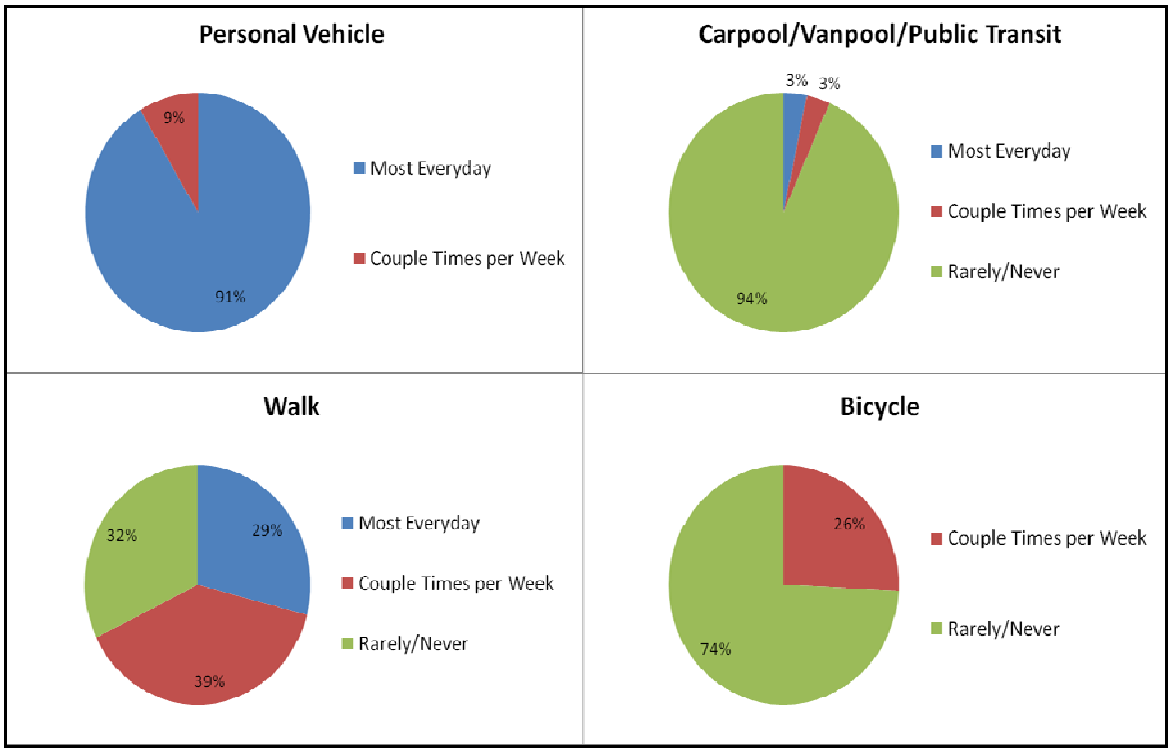


Figure 3 - Technical Survey Respondents (by Preferred Mode of Transportation)

The next respondent related questions dealt with the average length of their typical daily commute, measured in both distance and time. As shown in **Figure 4** and **Figure 5**, the majority of daily commutes made by respondents are observed to be less than 15 miles in length (83 percent) and take less than 30 minutes to complete (86 percent).

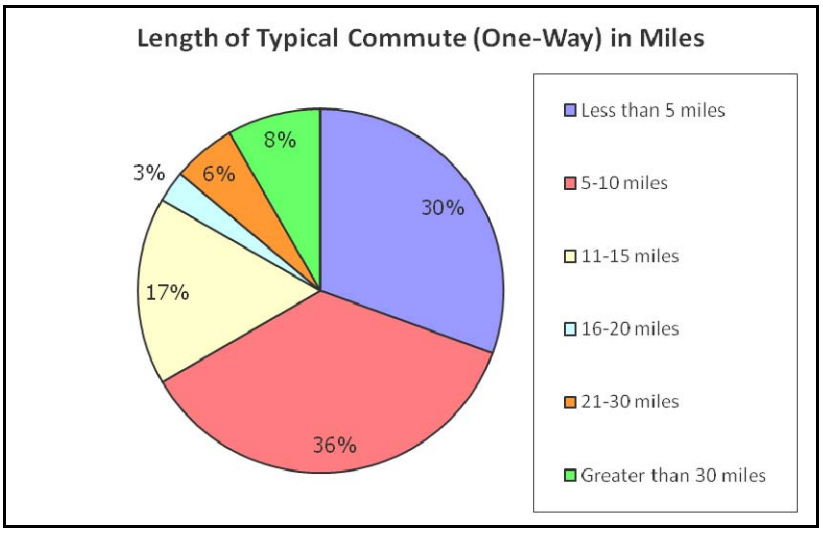


Figure 4 - Technical Survey Respondents (by Length of Typical Commute, in Miles)

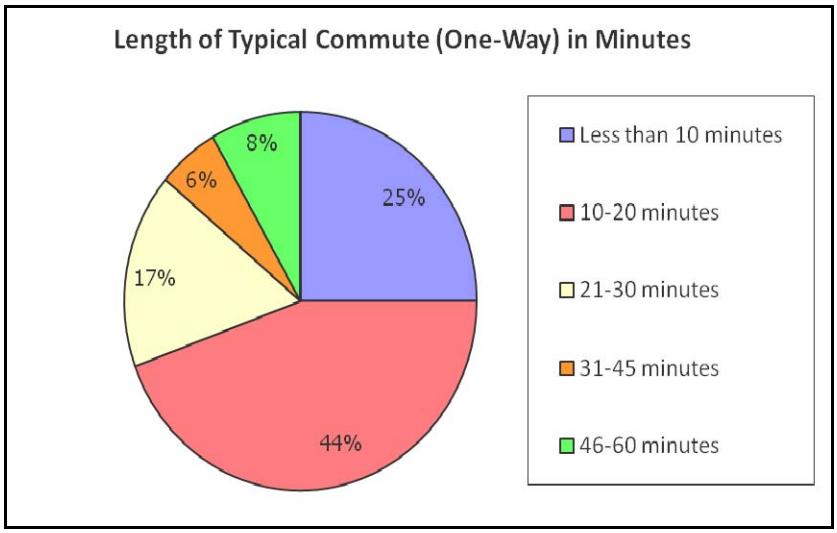


Figure 5 - Technical Survey Respondents (by Length of Commute, in Minutes)

When observing the different bridges and tunnels crossed during each respondent's daily commute, it is noticeable that approximately 41 percent of commuters do not cross a bridge or tunnel (See **Figure 6**). However, from the respondents who do cross a bridge or tunnel facility, approximately 32 percent of respondents use a tunnel facility while 27 percent use one of the bridge facilities.

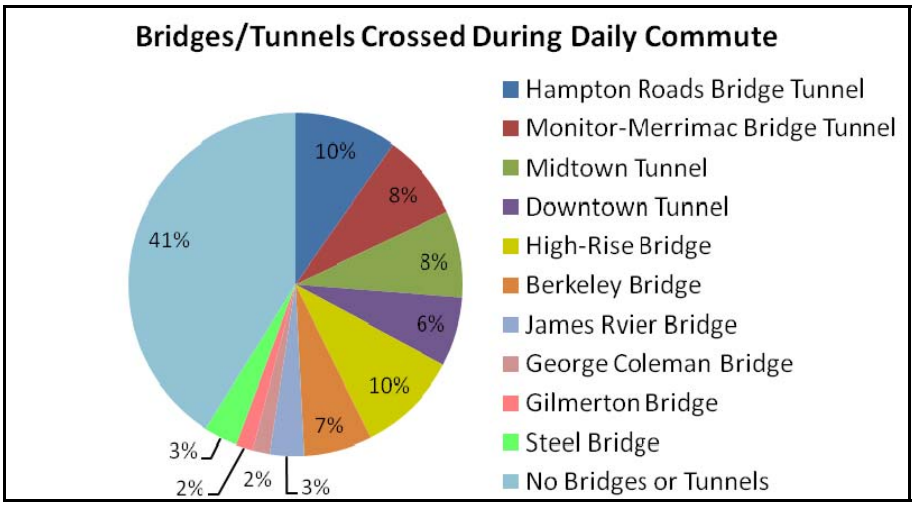


Figure 6 - Technical Survey Respondents (by Facility Crossed During Daily Commute)

E1.1 "Highways" Technical Survey Results

Nine different evaluation crtieria were included on the survey under the "Highways" category. **Figure 7** shows the relative importance of each according to the 36 total respondents. It is clear that *Congestion Level*, *Safety and Security*, *System Continuity and Connectivity*, *Cost Effectivness*, and *Land Use Compatibility* are all observed to be important to the respondents of the techical survey when considering the importance of a "Highways" project.

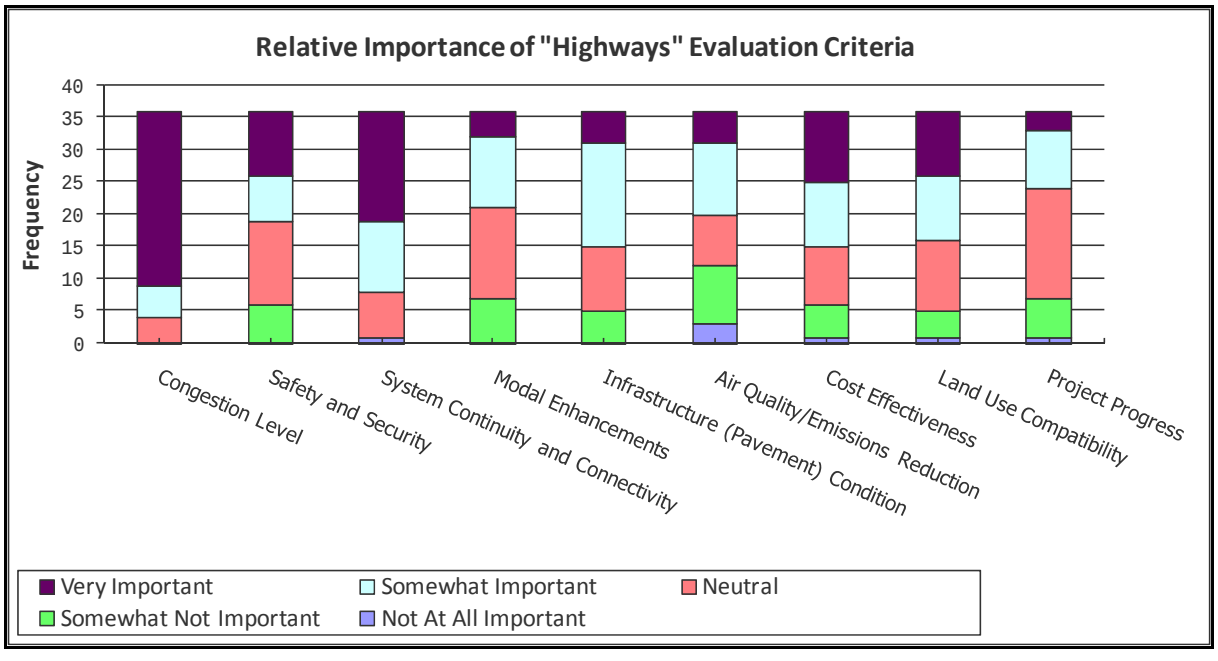


Figure 7 - Relative Importance of "Highways" Evaluation Criteria

With regards to weighting factor preference, refer to **Figure 8**. In **Figure 8**, it is observed that the relative importance results coincide accurately with the average weighting preferences, where *Congestion Level*,

Safety and Security, *System Continuity and Connectivity*, *Cost Effectivness*, and *Land Use Compatibility* are more significant than the other criteria.

Congestion Level has the highest average weighting factor preference with it being worth 18 out of a possible 100 points. *Air Quality* is the lowest with an average weighting factor value of six points. A more detailed analysis of responses by individual criterion and subcriterion is included in **Appendix E2**.

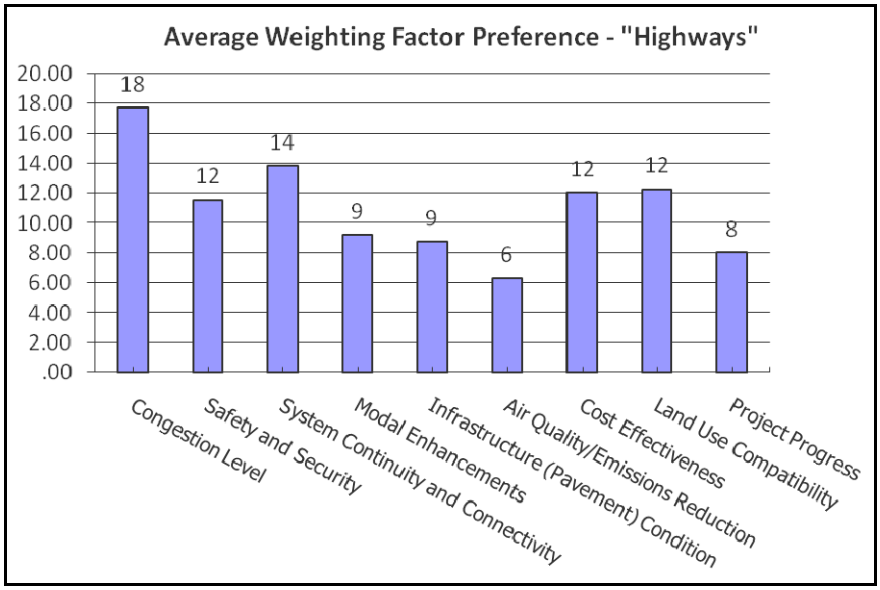


Figure 8 - Average Weighting Factor Preference for "Highways" Evaluation Criteria

E1.2 "Bridge/Tunnel" Technical Survey Results

Similar to "Highways," the Technical Survey included the same nine evaluation criteria for the "Bridge/Tunnel" category. **Figure 9** demonstrates that in terms of relative importance, *Congestion Level*, *System Continuity and Connectivity*, and *Infrastructure Condition* are all very important to the 36 total Technical Survey respondents when evaluating a "Bridge/Tunnel" project. However, *Modal Enhancements* and *Project Progress* are not seen to be very important.

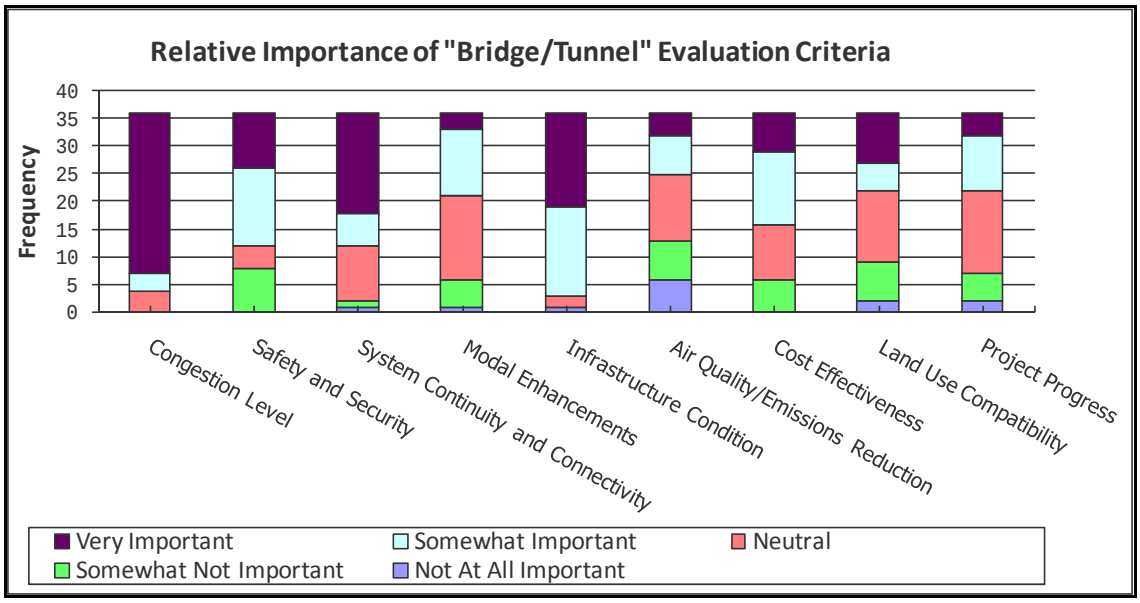


Figure 9 - Relative Importance of "Bridge/Tunnel" Evaluation Criteria

In **Figure 10**, the average weighting factors coincide with the relative importance results. *Congestion Level*, *System Continuity and Connectivity*, and *Infrastructure Condition* are observed to have average weighting factor preferences of 19, 12, and 18 points (out of 100 total avaialble), respectively. A more detailed analysis of responses by individual criterion and subcriterion is included in **Appendix E2**.

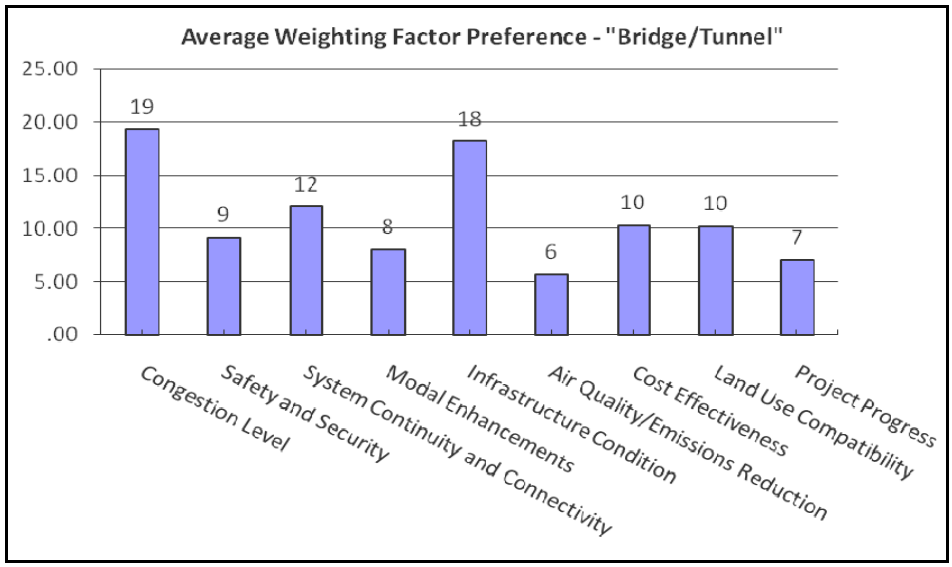


Figure 10 - Average Weighting Factor Preference for "Bridge/Tunnel" Evaluation Criteria

E1.3 "Bicycle and Pedestrian" Technical Survey Results

Six different evaluation criteria were included in the survey for the "Bicycle and Pedestrian" category. **Figure 11** illustrates that *Safety* and *System Continuity and Connectivity* are considered to be very important in the evaluation of "Bicycle and Pedestrian" projects, according to the 37 total individuals who

responded to this question. The remaining four criteria have some importance; however, they have much more Neutral responses.

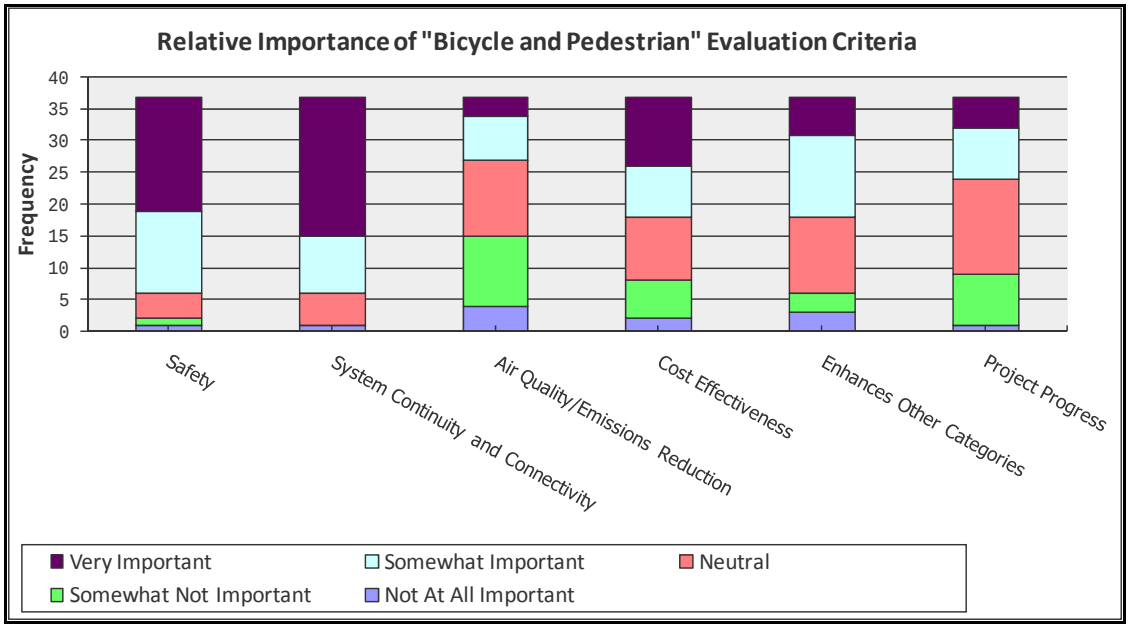


Figure 11 - Relative Importance of "Bicycle and Pedestrian" Evaluation Criteria

In **Figure 12** it is observed that out of 100 total points, the average responses for *Safety* and *System Continuity and Connectivity* are 23 and 25 points, respectively. Additionally, *Air Quality*, *Enhances Other Categories*, and *Project Progress* each averaged approximately 10 to 15 points. A more detailed analysis of responses by individual criterion and subcriterion is included in **Appendix E2**.

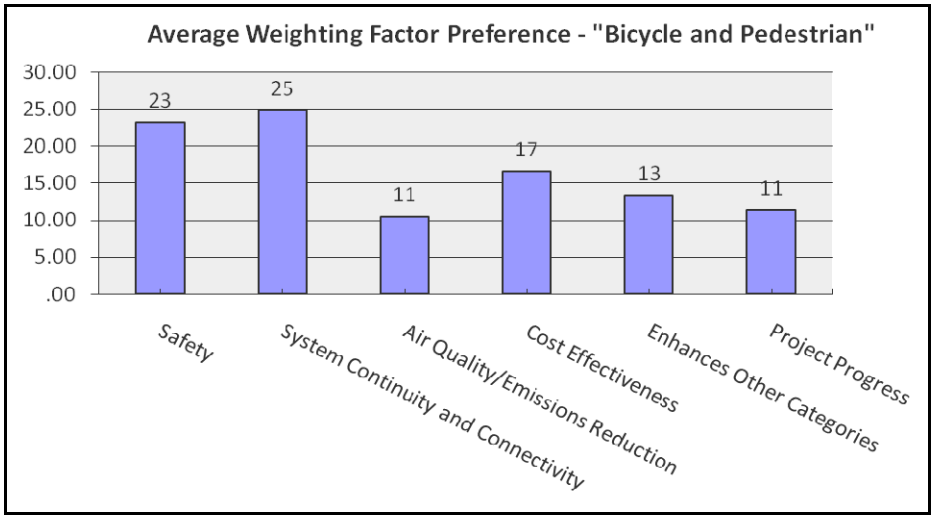


Figure 12 - Average Weighting Factor Preference for "Bicycle and Pedestrian" Evaluation Criteria

E1.4 "Systems Management/Transportation Demand Management/Operational Improvements" Technical Survey Results

Seven different evaluation criteria were included in the survey for the "Systems Management/TDM/ Operational Improvements" category. **Figure 13** illustrates that, according to the 36 total respondents, there are strong views that *Congestion Level* and *Air Quality/Emission Reduction* are very important while *Regional Significance*, *Safety*, and *Cost Effectiveness* also are observed to be important.

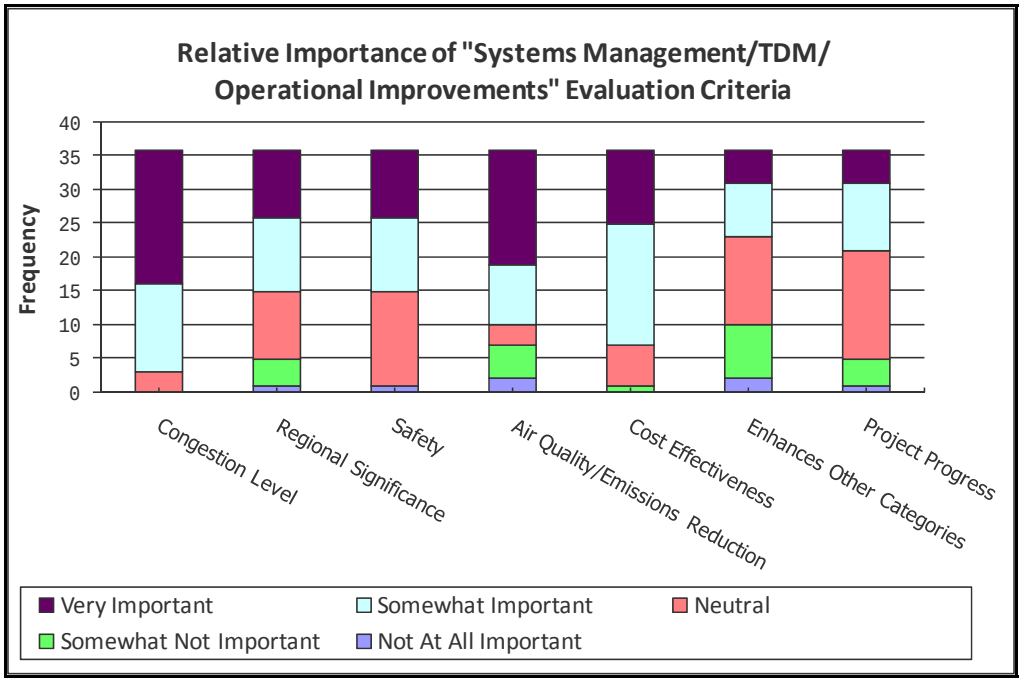


Figure 13 - Relative Importance of "Systems Management/Transportation Demand Management/Operational Improvements" Evaluation Criteria

Looking further at the average weighting factor preferences (**Figure 14**), *Congestion Level*, *Air Quality*, and *Cost Effectiveness* were observed to be approximately equal (19, 17, and 17 points, respectively). A more detailed analysis of responses by individual criterion and subcriterion is included in **Appendix E2**.

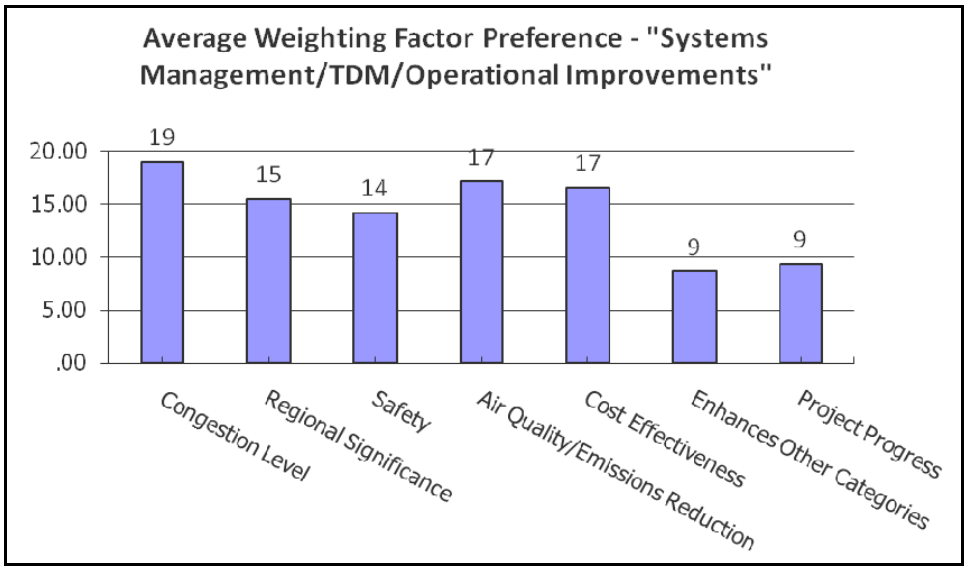


Figure 14 - Average Weighting Factor Preference for "Systems Management/Transportation Demand Management/Operational Improvements" Evaluation Criteria

E1.5 "Transit" Technical Survey Results

For "Transit," eight evaluation criteria were included in the Technical Survey. **Figure 15** illustrates that, according to the 36 total respondents, *User Benefit*, *Existing Usage/Prospective Ridership*, *System Continuity and Connectivity*, *Cost Effectivness*, and *Land Use Compatibility* are all seen to be important in evaluating "Transit" projects.

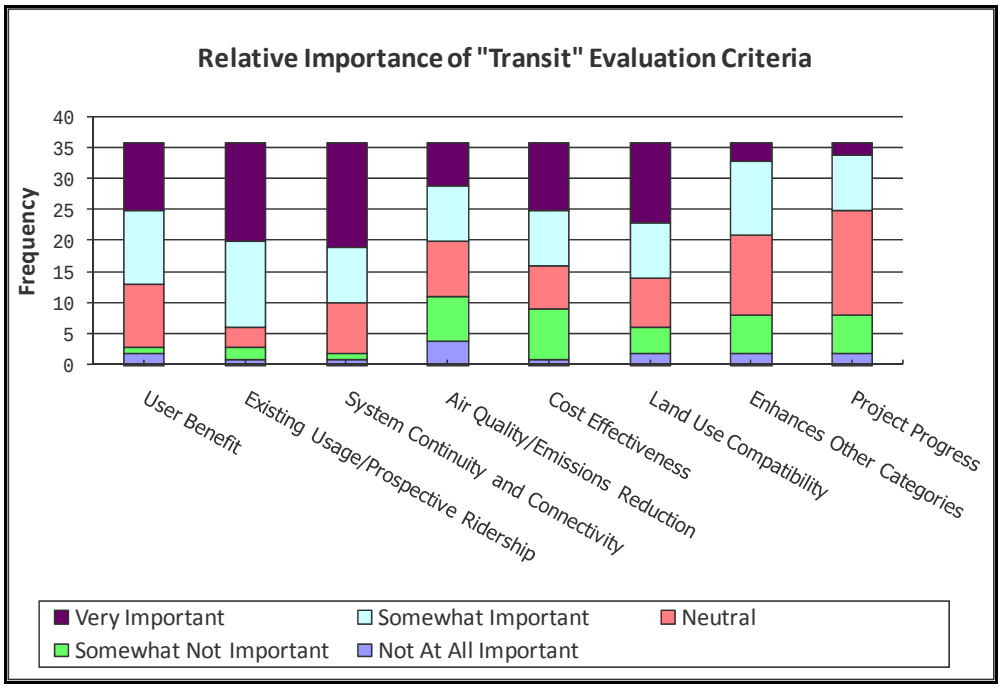


Figure 15 - Relative Importance of "Transit" Evaluation Criteria

When observing the average weighting factor preferences (**Figure 16**), the two evaluation criteria with the highest relative imortance also are observed to have the highest average weighting factor preferences (*Existing Usage/Prospective Ridership* and *System Continuity and Connectivity*). A more detailed analysis of responses by individual criterion and subcriterion is included in **Appendix E2**.

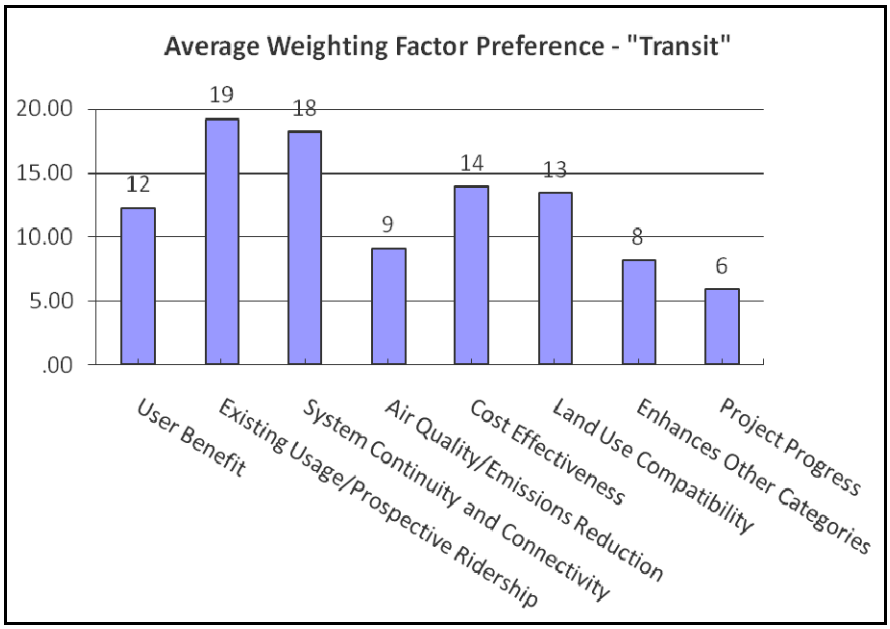


Figure 16 - Average Weighting Factor Preference for "Transit" Evaluation Criteria

E1.6 "Intermodal" Technical Survey Results

The "Intermodal" section of the Technical Survey included five evaluation criteria, as shown in **Figure 17**. From the 36 total respondents, it is clearly seen that the ability for a project to safely *Accommodate Intermodal Conflicts* with other traffic and *Improve Intermodal Access* to the transportation network are very important.

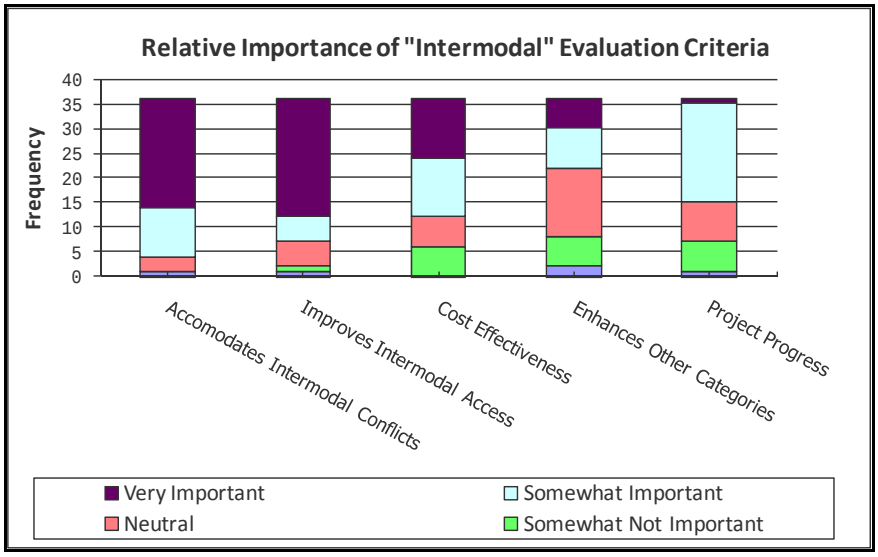


Figure 17 - Relative Importance of "Intermodal" Evaluation Criteria

These results are further backed by looking at the average weighting factor preferences for each criterion (**Figure 18**). *Accomodates Intermodal Conflicts* and *Improves Intermodal Access* have the highest average weighting scores of 26 and 27, respectively. A more detailed analysis of responses by individual criterion and subcriterion is included in **Appendix E2**.

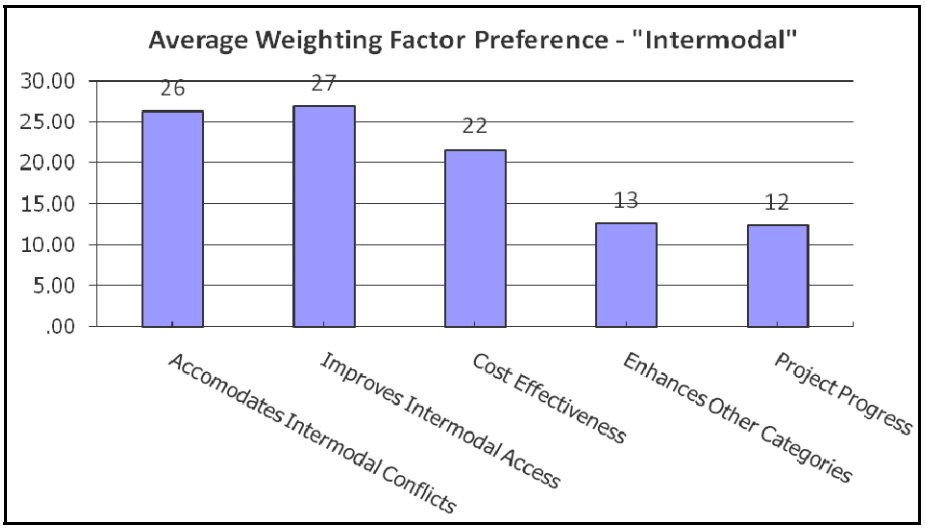


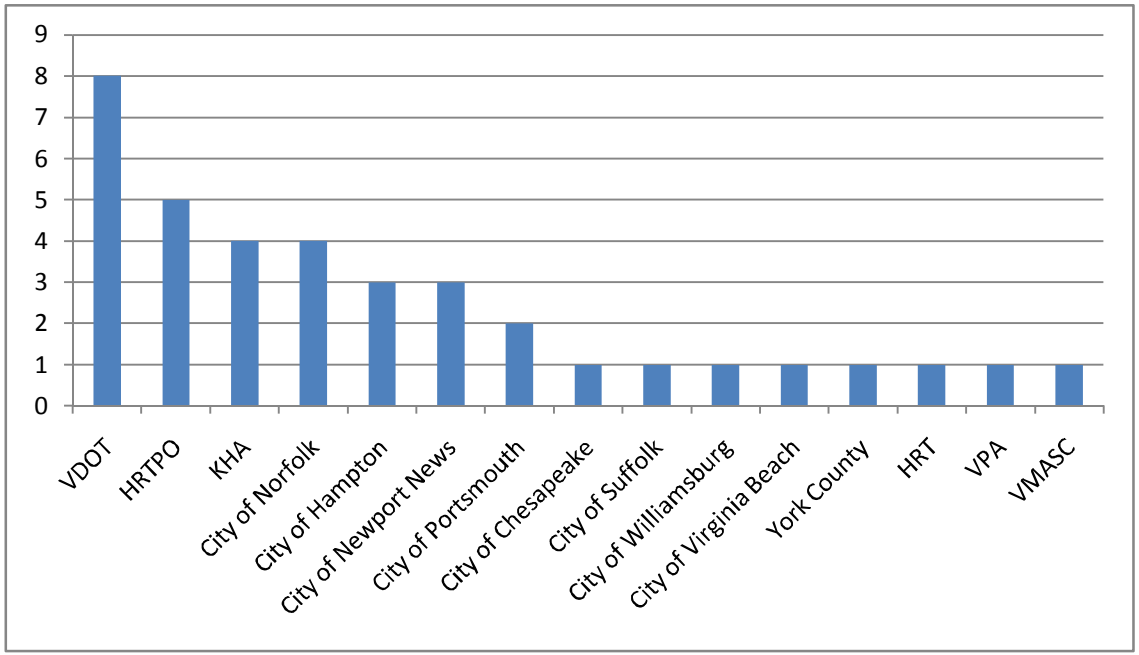
Figure 18 - Average Weighting Factor Preference for "Intermodal" Evaluation Criteria

Appendix E2

Detailed Technical Survey Results

Question 1

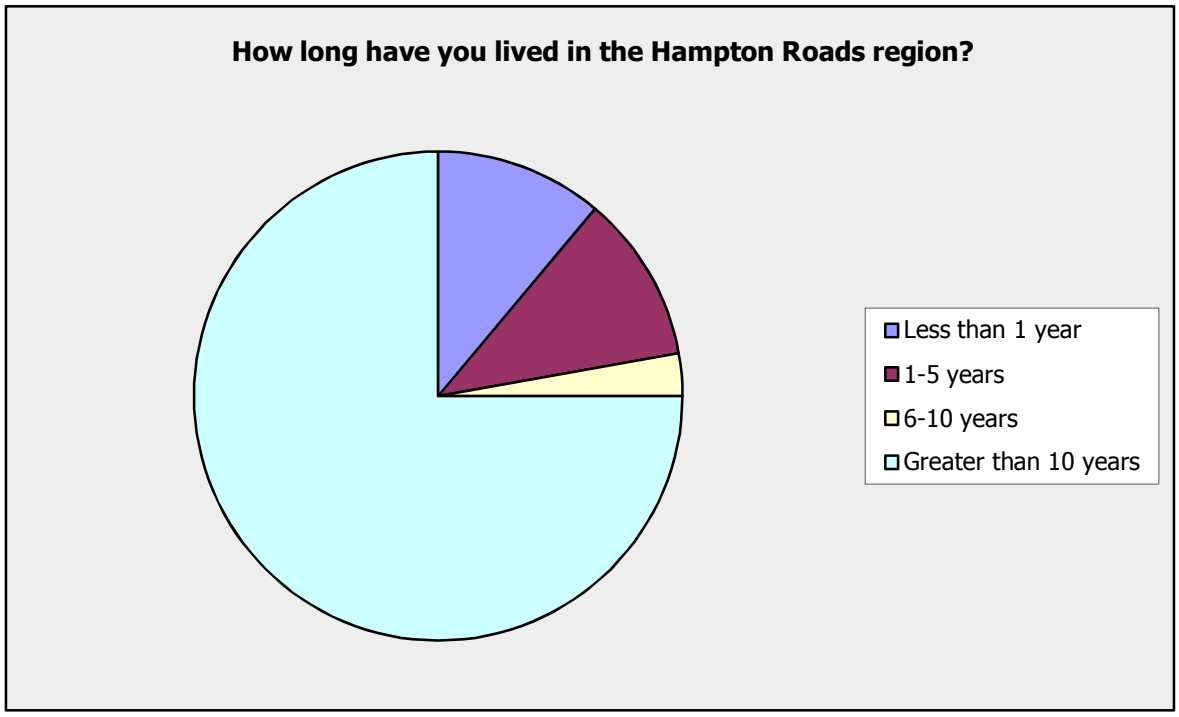
Jurisdiction	Frequency
VDOT	8
HRTPO	5
KHA	4
City of Norfolk	4
City of Hampton	3
City of Newport News	3
City of Portsmouth	2
City of Chesapeake	1
City of Suffolk	1
City of Williamsburg	1
City of Virginia Beach	1
York County	1
HRT	1
VPA	1
VMASC	1
TOTAL	**37**



Steering Committee	13	(out of 25)
Non-Steering Committee	24	
TOTAL	**37**	

HRTPO Program Priorities Survey - Technical Version

How long have you lived in the Hampton Roads region?		
Answer Options	**Response Percent**	**Response Count**
Less than 1 year	11.1%	4
1-5 years	11.1%	4
6-10 years	2.8%	1
Greater than 10 years	75.0%	27
answered question		**36**
skipped question		**0**

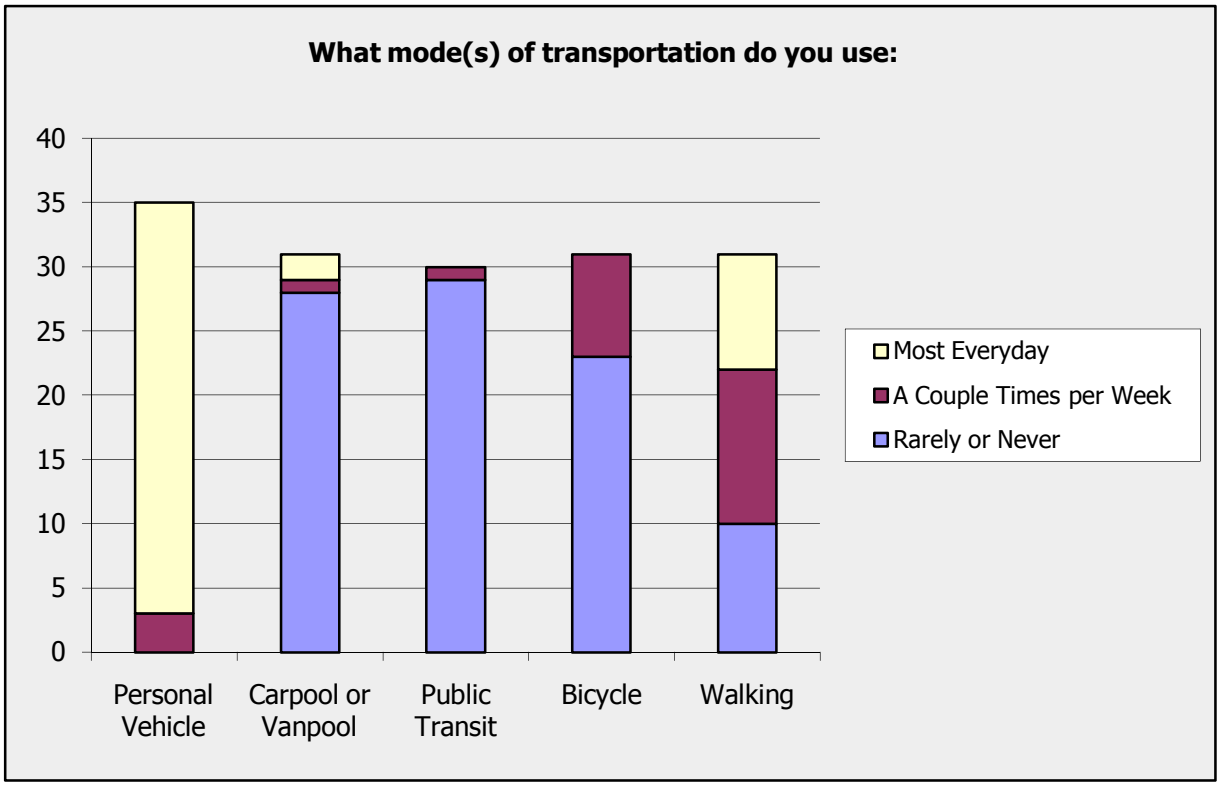


HRTPO Program Priorities Survey - Technical Version

What mode(s) of transportation do you use:

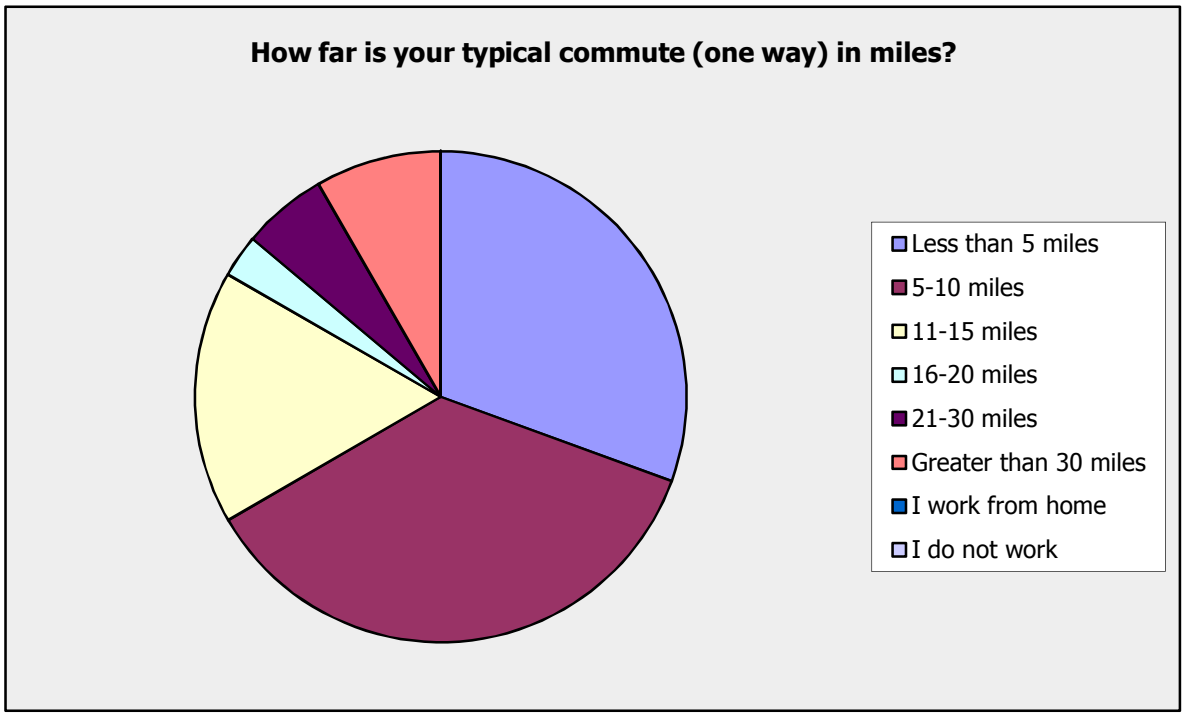
Answer Options	Most Everyday	A Couple Times per Week	Rarely or Never	Response Count
Personal Vehicle	32	3	0	35
Carpool or Vanpool	2	1	28	31
Public Transit	0	1	29	30
Bicycle	0	8	23	31
Walking	9	12	10	31
Other (please specify)				2
			answered question	**36**
			skipped question	**0**

Number	Response Date	Other (please specify)
1	Sep 17, 2009 8:36 PM	Biking in HR is too dangerous
2	Sep 22, 2009 9:03 PM	Walking for shopping trips near home but not commuting



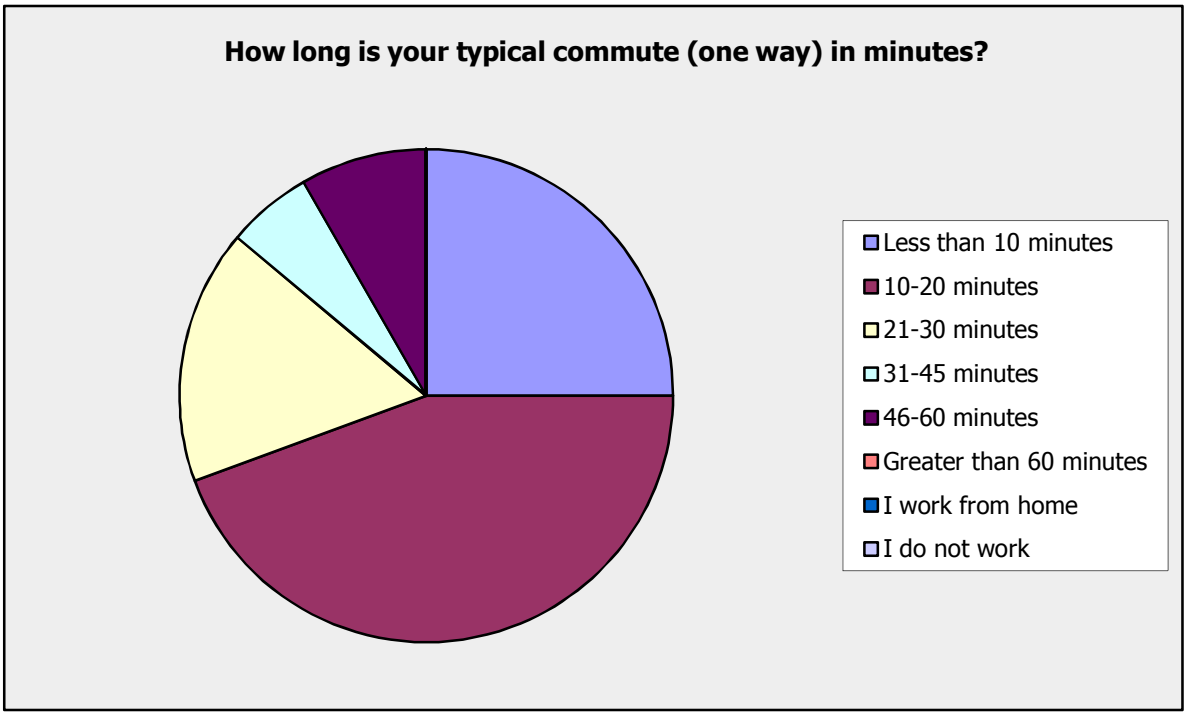
HRTPO Program Priorities Survey - Technical Version

How far is your typical commute (one way) in miles?		
Answer Options	**Response Percent**	**Response Count**
Less than 5 miles	30.6%	11
5-10 miles	36.1%	13
11-15 miles	16.7%	6
16-20 miles	2.8%	1
21-30 miles	5.6%	2
Greater than 30 miles	8.3%	3
I work from home	0.0%	0
I do not work	0.0%	0
answered question		**36**
skipped question		**0**



HRTPO Program Priorities Survey - Technical Version

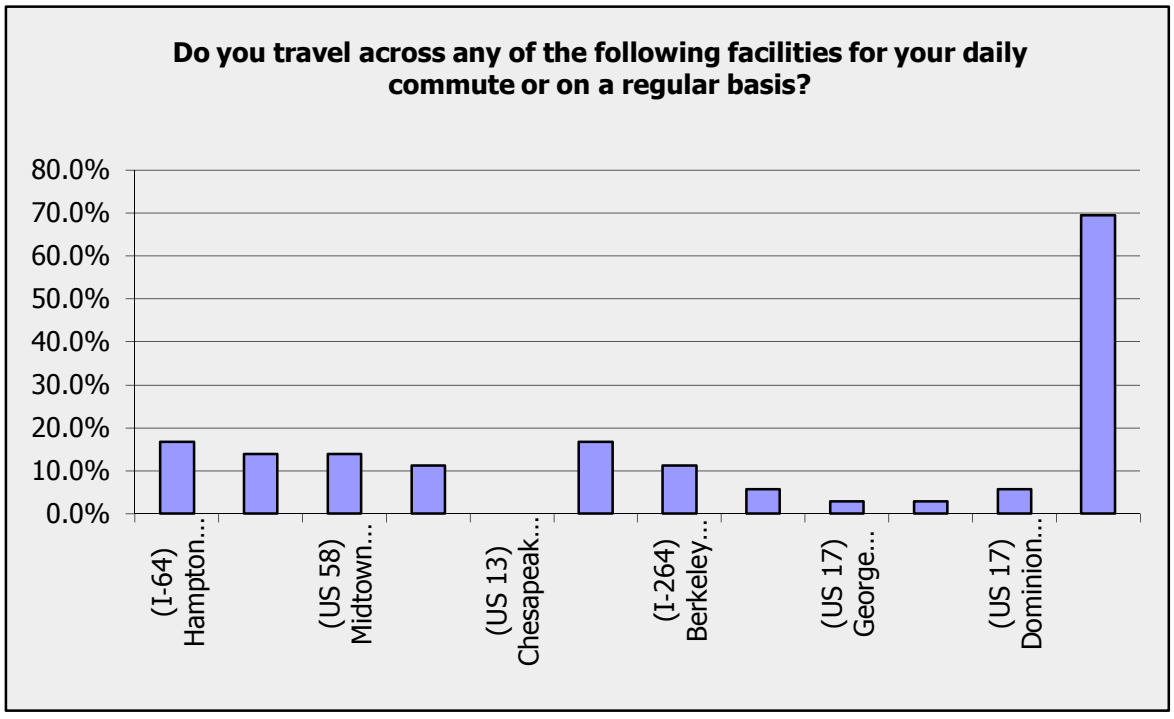
How long is your typical commute (one way) in minutes?		
Answer Options	**Response Percent**	**Response Count**
Less than 10 minutes	25.0%	9
10-20 minutes	44.4%	16
21-30 minutes	16.7%	6
31-45 minutes	5.6%	2
46-60 minutes	8.3%	3
Greater than 60 minutes	0.0%	0
I work from home	0.0%	0
I do not work	0.0%	0
answered question		**36**
skipped question		**0**



HRTPO Program Priorities Survey - Technical Version

Do you travel across any of the following facilities for your daily commute or on a regular basis?

Answer Options	Response Percent	Response Count
(I-64) Hampton Roads Bridge Tunnel	16.7%	6
(I-664) Monitor Merrimac Memorial Bridge Tunnel	13.9%	5
(US 58) Midtown Tunnel	13.9%	5
(I-264) Downtown Tunnel	11.1%	4
(US 13) Chesapeake Bay Bridge Tunnel	0.0%	0
(I-64) High-Rise Bridge	16.7%	6
(I-264) Berkeley Bridge	11.1%	4
(US 17) James River Bridge	5.6%	2
(US 17) George Coleman Bridge	2.8%	1
(US 460) Military Hwy Gilmerton Bridge	2.8%	1
(US 17) Dominion Blvd Steel Bridge	5.6%	2
None of the above	69.4%	25
answered question		**36**
skipped question		**0**



Highway Projects	Very Important	Somewhat Important	Neutral	Somewhat Not Imp.	Very Not Imp.	Weighted Score
Points	5	4	3	2	1	
Congestion Level	27	5	4	0	0	167
Safety and Security	10	7	13	6	0	129
System Continuity and Connectivity	17	11	7	0	1	151
Modal Enhancements	4	11	14	7	0	120
Infrastructure Condition (Pavement Condition)	5	16	10	5	0	129
Air Quality/Emissions Reduction	5	11	8	9	3	114
Cost Effectiveness	11	10	9	5	1	133
Compatibility with Existing Land Use Patterns and Future Plans and Development	10	10	11	4	1	132
Project Progress	3	9	17	6	1	115

Level of Importance:

Congestion Level	167
System Continuity and Connectivity	151
Cost Effectiveness	133
Compatibility with Existing Land Use Patterns and Future Plans and Development	132
Safety and Security	129
Infrastructure Condition (Pavement Condition)	129
Modal Enhancements	120
Project Progress	115
Air Quality/Emissions Reduction	114

HIGHWAY PROJECTS - MAIN CRITERIA WEIGHTING FACTORS

Number	Response Date	Congestion Level	Safety and Security	System Continuity and Connectivity	Modal Enhancements	Infrastructure (Pavement) Condition	Air Quality/ Emissions Reduction	Cost Effectiveness	Compatibility with Existing Land Use Patterns and Future Plans and Development	Project Progress
1	**Sep 17, 2009 8:10 PM**	15	10	15	10	15	10	5	15	5
2	**Sep 17, 2009 9:00 PM**	20	10	20	10	10	5	10	10	5
3	**Sep 17, 2009 9:17 PM**	20	10	20	15	10	0	5	20	0
4	**Sep 18, 2009 12:40 PM**	10	5	15	10	10	10	10	15	15
5	**Sep 18, 2009 1:11 PM**	25	20	15	5	15	0	5	10	5
6	**Sep 18, 2009 1:46 PM**	10	10	10	10	0	0	50	10	0
7	**Sep 18, 2009 2:32 PM**	10	10	20	20	5	5	5	20	5
8	**Sep 18, 2009 6:41 PM**	10	15	25	10	10	10	5	10	5
9	**Sep 20, 2009 10:44 PM**	30	5	10	5	5	10	10	20	5
10	**Sep 21, 2009 1:08 PM**	0	0	30	20	0	0	50	0	0
11	**Sep 21, 2009 2:04 PM**	20	5	15	5	5	5	20	10	15
12	**Sep 21, 2009 6:33 PM**	20	10	5	10	15	5	20	10	5
13	**Sep 21, 2009 6:45 PM**	20	10	10	5	10	10	15	5	15
14	**Sep 22, 2009 1:14 PM**	20	20	10	10	20	5	5	5	5
15	**Sep 22, 2009 5:16 PM**	15	5	5	5	20	10	20	15	5
16	**Sep 22, 2009 9:06 PM**	20	20	10	5	10	10	10	5	10
17	**Sep 22, 2009 9:10 PM**	15	15	10	10	5	10	15	10	10
18	**Sep 22, 2009 9:13 PM**	20	30	30	0	0	0	10	10	0
19	**Sep 22, 2009 9:16 PM**	15	10	5	20	5	5	15	15	10
20	**Sep 22, 2009 9:40 PM**	25	25	25	5	2	3	5	5	5
21	**Sep 23, 2009 11:59 AM**	15	12	15	7	8	15	10	13	5
22	**Sep 23, 2009 12:29 PM**	20	10	15	5	5	10	20	5	10
23	**Sep 23, 2009 12:47 PM**	20	10	25	5	5	10	10	5	10
24	**Sep 23, 2009 1:33 PM**	10	10	10	10	10	10	10	20	10
25	**Sep 23, 2009 2:40 PM**	10	5	15	15	10	10	10	10	15
26	**Sep 23, 2009 2:41 PM**	20	15	20	15	10	5	5	5	5
27	**Sep 23, 2009 2:59 PM**	25	15	5	5	10	0	0	25	15
28	**Sep 23, 2009 3:03 PM**	25	15	5	5	10	0	0	25	15
29	**Sep 23, 2009 5:56 PM**	20	10	15	15	10	5	10	10	5
30	**Sep 23, 2009 6:08 PM**	25	15	5	5	10	0	0	25	15
31	**Sep 23, 2009 7:08 PM**	15	10	10	10	5	15	10	15	10
32	**Sep 23, 2009 7:59 PM**	25	15	5	5	10	0	0	25	15
33	**Sep 23, 2009 10:48 PM**	10	10	15	15	5	10	15	10	10
34	**Sep 24, 2009 2:04 AM**	20	5	15	5	10	15	15	5	10
35	**Sep 24, 2009 10:16 AM**	15	10	10	10	10	5	15	20	5
36	**Sep 24, 2009 12:43 PM**	25	5	10	10	15	5	15	5	10

Minimum	0	0	5	0	0	0	0	0	0
Maximum	30	30	30	20	20	15	50	25	15
Median	20	10	15	10	10	5	10	10	7.5
Mode	20	10	15	5	10	10	10	10	5
Mean	18	12	14	9	9	6	12	12	8
# of Zeros	**1**	**1**	**0**	**1**	**3**	**9**	**4**	**1**	**4**

HIGHWAY PROJECTS - "CONGESTION LEVEL" SUB-CRITERIA

Number	Response Date	Existing and Future Levels of Congestion on Roadway	Impact to Nearby Roadways
1	**Sep 17, 2009 8:11 PM**	65	35
2	**Sep 17, 2009 9:02 PM**	60	40
3	**Sep 17, 2009 9:19 PM**	50	50
4	**Sep 18, 2009 12:41 PM**	55	45
5	**Sep 18, 2009 1:13 PM**	60	40
6	**Sep 18, 2009 1:46 PM**	100	0
7	**Sep 18, 2009 2:33 PM**	50	50
8	**Sep 18, 2009 6:43 PM**	60	40
9	**Sep 20, 2009 10:45 PM**	75	25
10	**Sep 21, 2009 1:14 PM**	100	0
11	**Sep 21, 2009 2:09 PM**	70	30
12	**Sep 21, 2009 6:34 PM**	75	25
13	**Sep 21, 2009 6:47 PM**	95	5
14	**Sep 22, 2009 1:16 PM**	60	40
15	**Sep 22, 2009 5:17 PM**	75	25
16	**Sep 22, 2009 9:07 PM**	70	30
17	**Sep 22, 2009 9:12 PM**	70	30
18	**Sep 22, 2009 9:14 PM**	70	30
19	**Sep 22, 2009 9:17 PM**	50	50
20	**Sep 22, 2009 9:42 PM**	70	30
21	**Sep 23, 2009 12:02 PM**	55	45
22	**Sep 23, 2009 12:31 PM**	70	30
23	**Sep 23, 2009 12:48 PM**	80	20
24	**Sep 23, 2009 1:34 PM**	40	60
25	**Sep 23, 2009 2:41 PM**	65	35
26	**Sep 23, 2009 2:42 PM**	80	20
27	**Sep 23, 2009 2:59 PM**	75	25
28	**Sep 23, 2009 3:03 PM**	75	25
29	**Sep 23, 2009 6:08 PM**	75	25
30	**Sep 23, 2009 7:08 PM**	60	40
31	**Sep 23, 2009 8:00 PM**	75	25
32	**Sep 23, 2009 8:06 PM**	70	30
33	**Sep 23, 2009 10:50 PM**	65	35
34	**Sep 24, 2009 2:05 AM**	60	40
35	**Sep 24, 2009 10:17 AM**	60	40
36	**Sep 24, 2009 12:46 PM**	75	25

Minimum	40	0
Maximum	100	60
Median	70	30
Mode	75	25
Mean	68	32
# of Zeros	**0**	**2**

HIGHWAY PROJECTS - "MODAL ENHANCEMENTS" SUB-CRITERIA

Number	Response Date	Improves vehicular access to freight distribution facilities, ports, major industrial clients, or employment and population centers	Includes HOV, transit, or bike/ped facilities or enhancements
1	**Sep 17, 2009 8:11 PM**	65	35
2	**Sep 17, 2009 9:02 PM**	40	60
3	**Sep 17, 2009 9:19 PM**	60	40
4	**Sep 18, 2009 12:41 PM**	45	55
5	**Sep 18, 2009 1:13 PM**	80	20
6	**Sep 18, 2009 1:46 PM**	100	0
7	**Sep 18, 2009 2:33 PM**	40	60
8	**Sep 18, 2009 6:43 PM**	50	50
9	**Sep 20, 2009 10:45 PM**	80	20
10	**Sep 21, 2009 1:14 PM**	50	50
11	**Sep 21, 2009 2:09 PM**	60	40
12	**Sep 21, 2009 6:34 PM**	45	55
13	**Sep 21, 2009 6:47 PM**	25	75
14	**Sep 22, 2009 1:16 PM**	70	30
15	**Sep 22, 2009 5:17 PM**	70	30
16	**Sep 22, 2009 9:07 PM**	60	40
17	**Sep 22, 2009 9:12 PM**	70	30
18	**Sep 22, 2009 9:14 PM**	70	30
19	**Sep 22, 2009 9:17 PM**	75	25
20	**Sep 22, 2009 9:42 PM**	50	50
21	**Sep 23, 2009 12:02 PM**	60	40
22	**Sep 23, 2009 12:31 PM**	70	30
23	**Sep 23, 2009 12:48 PM**	50	50
24	**Sep 23, 2009 1:34 PM**	50	50
25	**Sep 23, 2009 2:41 PM**	60	40
26	**Sep 23, 2009 2:42 PM**	40	60
27	**Sep 23, 2009 2:59 PM**	60	40
28	**Sep 23, 2009 3:03 PM**	60	40
29	**Sep 23, 2009 6:08 PM**	60	40
30	**Sep 23, 2009 7:08 PM**	40	60
31	**Sep 23, 2009 8:00 PM**	60	40
32	**Sep 23, 2009 8:06 PM**	50	50
33	**Sep 23, 2009 10:50 PM**	30	70
34	**Sep 24, 2009 2:05 AM**	60	40
35	**Sep 24, 2009 10:17 AM**	95	5
36	**Sep 24, 2009 12:46 PM**	70	30

Minimum	25	0
Maximum	100	75
Median	60	40
Mode	60	40
Mean	59	41
# of Zeros	**0**	**1**

HIGHWAY PROJECTS - "PROJECT PROGRESS" SUB-CRITERIA

Number	Response Date	Additional Local Match / Other Funding Availability (e.g., Private Investment)	Federal Mandates	Prior Commitment	Project Readiness
1	**Sep 17, 2009 8:11 PM**	25	30	20	25
2	**Sep 17, 2009 9:02 PM**	25	35	20	20
3	**Sep 17, 2009 9:19 PM**	30	50	10	10
4	**Sep 18, 2009 12:41 PM**	20	20	30	30
5	**Sep 18, 2009 1:13 PM**	10	50	25	15
6	**Sep 18, 2009 1:46 PM**	50	50	0	0
7	**Sep 18, 2009 2:33 PM**	5	60	5	30
8	**Sep 18, 2009 6:43 PM**	25	50	15	10
9	**Sep 20, 2009 10:45 PM**	40	20	20	20
10	**Sep 21, 2009 1:14 PM**	0	50	0	50
11	**Sep 21, 2009 2:09 PM**	15	15	40	30
12	**Sep 21, 2009 6:34 PM**	70	5	5	20
13	**Sep 21, 2009 6:47 PM**	10	60	5	25
14	**Sep 22, 2009 1:16 PM**	30	30	20	20
15	**Sep 22, 2009 5:17 PM**	15	15	35	35
16	**Sep 22, 2009 9:07 PM**	20	60	10	10
17	**Sep 22, 2009 9:12 PM**	15	70	5	10
18	**Sep 22, 2009 9:14 PM**	40	20	20	20
19	**Sep 22, 2009 9:17 PM**	50	10	20	20
20	**Sep 22, 2009 9:42 PM**	25	25	25	25
21	**Sep 23, 2009 12:02 PM**	30	25	25	20
22	**Sep 23, 2009 12:31 PM**	40	10	20	30
23	**Sep 23, 2009 12:48 PM**	50	20	15	15
24	**Sep 23, 2009 1:34 PM**	25	25	25	25
25	**Sep 23, 2009 2:41 PM**	25	25	25	25
26	**Sep 23, 2009 2:42 PM**	30	30	20	20
27	**Sep 23, 2009 2:59 PM**	40	0	0	60
28	**Sep 23, 2009 3:03 PM**	40	0	0	60
29	**Sep 23, 2009 6:08 PM**	40	0	0	60
30	**Sep 23, 2009 7:08 PM**	20	20	30	30
31	**Sep 23, 2009 8:00 PM**	40	0	0	60
32	**Sep 23, 2009 8:06 PM**	35	15	20	30
33	**Sep 23, 2009 10:50 PM**	20	30	20	30
34	**Sep 24, 2009 2:05 AM**	30	30	10	30
35	**Sep 24, 2009 10:17 AM**	40	30	10	20
36	**Sep 24, 2009 12:46 PM**	10	15	50	25

Minimum	0	0	0	0
Maximum	70	70	50	60
Median	27.5	25	20	25
Mode	40	30	20	20
Mean	29	28	17	27
# of Zeros	**1**	**4**	**6**	**1**

HIGHWAY PROJECTS - "SAFETY AND SECURITY" SUB-CRITERIA

Number	Response Date	Crash Rate	Improvement to Geometric Deficiencies	Improvements to Incident Management or Evacuation Routes
1	**Sep 17, 2009 8:11 PM**	35	30	35
2	**Sep 17, 2009 9:02 PM**	30	30	40
3	**Sep 17, 2009 9:19 PM**	30	20	50
4	**Sep 18, 2009 12:41 PM**	35	30	35
5	**Sep 18, 2009 1:13 PM**	50	30	20
6	**Sep 18, 2009 1:46 PM**	50	0	50
7	**Sep 18, 2009 2:33 PM**	40	20	40
8	**Sep 18, 2009 6:43 PM**	40	40	20
9	**Sep 20, 2009 10:45 PM**	40	30	30
10	**Sep 21, 2009 1:14 PM**	50	0	50
11	**Sep 21, 2009 2:09 PM**	40	30	30
12	**Sep 21, 2009 6:34 PM**	45	20	35
13	**Sep 21, 2009 6:47 PM**	30	50	20
14	**Sep 22, 2009 1:16 PM**	60	20	20
15	**Sep 22, 2009 5:17 PM**	25	50	25
16	**Sep 22, 2009 9:07 PM**	60	20	20
17	**Sep 22, 2009 9:12 PM**	60	10	30
18	**Sep 22, 2009 9:14 PM**	40	20	40
19	**Sep 22, 2009 9:17 PM**	25	25	50
20	**Sep 22, 2009 9:42 PM**	20	30	50
21	**Sep 23, 2009 12:02 PM**	20	30	50
22	**Sep 23, 2009 12:31 PM**	50	30	20
23	**Sep 23, 2009 12:48 PM**	50	25	25
24	**Sep 23, 2009 1:34 PM**	40	20	40
25	**Sep 23, 2009 2:41 PM**	40	20	40
26	**Sep 23, 2009 2:42 PM**	30	30	40
27	**Sep 23, 2009 2:59 PM**	40	40	20
28	**Sep 23, 2009 3:03 PM**	40	40	20
29	**Sep 23, 2009 6:08 PM**	40	20	40
30	**Sep 23, 2009 7:08 PM**	30	30	40
31	**Sep 23, 2009 8:00 PM**	40	40	20
32	**Sep 23, 2009 8:06 PM**	40	30	30
33	**Sep 23, 2009 10:50 PM**	50	20	30
34	**Sep 24, 2009 2:05 AM**	40	30	30
35	**Sep 24, 2009 10:17 AM**	40	40	20
36	**Sep 24, 2009 12:46 PM**	35	40	25

Minimum	20	0	20
Maximum	60	50	50
Median	40	30	30
Mode	40	30	20
Mean	40	28	33
# of Zeros	**0**	**2**	**0**

Bridge and Tunnel Projects	Very Important	Somewhat Important	Neutral	Somewhat Not Imp.	Very Not Imp.	Weighted Score
Points	5	4	3	2	1	
Congestion Level	29	3	4	0	0	169
Safety and Security	10	14	4	8	0	134
System Continuity and Connectivity	18	6	10	1	1	147
Modal Enhancements	3	12	15	5	1	119
Infrastructure Condition (Bridge Sufficiency Rating or Tunnel Condition)	17	16	2	0	1	156
Air Quality/Emissions Reduction	4	7	12	7	6	104
Cost Effectiveness	7	13	10	6	0	129
Compatibility with Existing Land Use Patterns and Future Plans and Development	9	5	13	7	2	120
Project Progress	4	10	15	5	2	117

Level of Importance:

Congestion Level	169
Infrastructure Condition	156
System Continuity and Connectivity	147
Safety and Security	134
Cost Effectiveness	129
Compatibility with Existing Land Use Patterns and Future Plans and Development	120
Modal Enhancements	119
Project Progress	117
Air Quality/Emissions Reduction	104

BRIDGE AND TUNNEL PROJECTS - MAIN CRITERIA WEIGHTING FACTORS

Number	Response Date	Congestion Level	Safety and Security	System Continuity and Connectivity	Modal Enhancements	Infrastructure Condition (Bridge Sufficiency Rating or Tunnel Condition)	Air Quality/ Emissions Reduction	Cost Effectiveness	Compatibility with Existing Land Use Patterns and Future Plans and Development	Project Progress
1	Sep 17, 2009 8:07 PM	15	10	15	5	15	10	10	15	5
2	Sep 17, 2009 8:54 PM	20	10	15	10	10	5	10	10	10
3	Sep 17, 2009 8:56 PM	15	10	10	10	15	10	15	10	5
4	Sep 17, 2009 9:12 PM	15	15	15	10	15	0	5	20	5
5	Sep 18, 2009 12:36 PM	10	5	20	10	15	5	10	15	10
6	Sep 18, 2009 1:06 PM	25	15	15	5	20	0	10	5	5
7	Sep 18, 2009 1:39 PM	25	0	0	0	25	0	25	25	0
8	Sep 18, 2009 2:27 PM	10	5	10	10	40	10	10	5	0
9	Sep 20, 2009 10:42 PM	40	5	5	5	10	10	10	10	5
10	Sep 21, 2009 1:05 PM	0	0	0	20	50	0	30	0	0
11	Sep 21, 2009 1:48 PM	25	5	20	0	20	5	15	5	5
12	Sep 21, 2009 6:25 PM	35	10	25	0	10	20	0	0	0
13	Sep 21, 2009 6:27 PM	25	15	10	0	20	5	10	0	15
14	Sep 22, 2009 12:49 PM	15	20	10	10	20	5	10	5	5
15	Sep 22, 2009 5:10 PM	10	5	10	5	20	10	20	10	10
16	Sep 22, 2009 9:06 PM	15	10	10	10	15	10	15	10	5
17	Sep 22, 2009 9:06 PM	15	20	20	5	10	5	10	5	10
18	Sep 22, 2009 9:09 PM	30	20	0	0	40	0	10	0	0
19	Sep 22, 2009 9:11 PM	20	5	5	20	5	10	10	20	5
20	Sep 22, 2009 9:31 PM	25	20	20	6	10	3	6	4	6
21	Sep 23, 2009 11:50 AM	20	10	20	8	15	8	5	7	7
22	Sep 23, 2009 12:22 PM	25	5	10	5	25	0	20	5	5
23	Sep 23, 2009 12:34 PM	15	10	20	5	15	8	15	2	10
24	Sep 23, 2009 1:31 PM	5	10	10	10	10	10	10	25	10
25	Sep 23, 2009 2:30 PM	20	5	15	15	10	10	5	10	10
26	Sep 23, 2009 2:36 PM	25	15	25	5	15	5	5	0	5
27	Sep 23, 2009 2:58 PM	25	0	5	10	25	0	0	25	10
28	Sep 23, 2009 3:00 PM	25	0	5	10	25	0	0	25	10
29	Sep 23, 2009 5:47 PM	10	10	20	10	25	5	10	5	5
30	Sep 23, 2009 6:07 PM	25	0	5	10	25	0	0	25	10
31	Sep 23, 2009 7:07 PM	15	10	15	5	10	15	5	10	15
32	Sep 23, 2009 7:56 PM	25	0	5	10	25	0	0	25	10
33	Sep 23, 2009 10:41 PM	15	10	15	15	15	5	10	5	10
34	Sep 24, 2009 1:55 AM	25	10	10	15	5	5	10	5	15
35	Sep 24, 2009 10:12 AM	15	15	10	5	5	5	20	15	10
36	Sep 24, 2009 12:27 PM	15	15	10	10	20	5	15	5	5

Minimum	0	0	0	0	5	0	0	0	0
Maximum	40	20	25	20	50	20	30	25	15
Median	20	10	10	10	15	5	10	8.5	5.5
Mode	25	10	10	10	15	5	10	5	5
Mean	19	9	12	8	18	6	10	10	7
# of Zeros	**1**	**6**	**3**	**5**	**0**	**10**	**5**	**5**	**5**

BRIDGE AND TUNNEL PROJECTS - "CONGESTION" SUB-CRITERIA

Number	Response Date	Existing and Future Levels of Congestion on Structure	Impact to Nearby Roadways
1	**Sep 17, 2009 8:09 PM**	60	40
2	**Sep 17, 2009 8:57 PM**	60	40
3	**Sep 17, 2009 9:14 PM**	50	50
4	**Sep 18, 2009 12:38 PM**	45	55
5	**Sep 18, 2009 1:08 PM**	60	40
6	**Sep 18, 2009 1:42 PM**	100	0
7	**Sep 18, 2009 2:31 PM**	75	25
8	**Sep 18, 2009 6:37 PM**	50	50
9	**Sep 20, 2009 10:43 PM**	75	25
10	**Sep 21, 2009 1:06 PM**	100	0
11	**Sep 21, 2009 1:52 PM**	70	30
12	**Sep 21, 2009 6:27 PM**	65	35
13	**Sep 21, 2009 6:34 PM**	95	5
14	**Sep 22, 2009 12:56 PM**	60	40
15	**Sep 22, 2009 5:13 PM**	50	50
16	**Sep 22, 2009 9:06 PM**	60	40
17	**Sep 22, 2009 9:09 PM**	70	30
18	**Sep 22, 2009 9:11 PM**	70	30
19	**Sep 22, 2009 9:13 PM**	50	50
20	**Sep 22, 2009 9:40 PM**	70	30
21	**Sep 23, 2009 11:53 AM**	60	40
22	**Sep 23, 2009 12:26 PM**	60	40
23	**Sep 23, 2009 12:37 PM**	80	20
24	**Sep 23, 2009 1:31 PM**	50	50
25	**Sep 23, 2009 2:32 PM**	65	35
26	**Sep 23, 2009 2:38 PM**	75	25
27	**Sep 23, 2009 2:58 PM**	75	25
28	**Sep 23, 2009 3:01 PM**	75	25
29	**Sep 23, 2009 5:50 PM**	60	40
30	**Sep 23, 2009 6:07 PM**	75	25
31	**Sep 23, 2009 7:07 PM**	50	50
32	**Sep 23, 2009 7:57 PM**	75	25
33	**Sep 23, 2009 10:43 PM**	65	35
34	**Sep 24, 2009 2:04 AM**	60	40
35	**Sep 24, 2009 10:13 AM**	60	40
36	**Sep 24, 2009 12:35 PM**	60	40

Minimum	45	0
Maximum	100	55
Median	62.5	37.5
Mode	60	40
Mean	66	34
# of Zeros	**0**	**2**

BRIDGE AND TUNNEL PROJECTS - "MODAL ENHANCEMENTS" SUB-CRITERIA

Number	Response Date	Includes HOV, transit, or bike/ped facilities or enhancements	Improves vehicular access to freight distribution facilities, ports, major industrial clients, or employment and population centers
1	**Sep 17, 2009 8:09 PM**	55	45
2	**Sep 17, 2009 8:57 PM**	35	65
3	**Sep 17, 2009 9:14 PM**	20	80
4	**Sep 18, 2009 12:38 PM**	45	55
5	**Sep 18, 2009 1:08 PM**	25	75
6	**Sep 18, 2009 1:42 PM**	0	100
7	**Sep 18, 2009 2:31 PM**	25	75
8	**Sep 18, 2009 6:37 PM**	25	75
9	**Sep 20, 2009 10:43 PM**	40	60
10	**Sep 21, 2009 1:06 PM**	50	50
11	**Sep 21, 2009 1:52 PM**	25	75
12	**Sep 21, 2009 6:27 PM**	50	50
13	**Sep 21, 2009 6:34 PM**	90	10
14	**Sep 22, 2009 12:56 PM**	25	75
15	**Sep 22, 2009 5:13 PM**	30	70
16	**Sep 22, 2009 9:06 PM**	50	50
17	**Sep 22, 2009 9:09 PM**	30	70
18	**Sep 22, 2009 9:11 PM**	20	80
19	**Sep 22, 2009 9:13 PM**	25	75
20	**Sep 22, 2009 9:40 PM**	50	50
21	**Sep 23, 2009 11:53 AM**	30	70
22	**Sep 23, 2009 12:26 PM**	30	70
23	**Sep 23, 2009 12:37 PM**	50	50
24	**Sep 23, 2009 1:31 PM**	50	50
25	**Sep 23, 2009 2:32 PM**	40	60
26	**Sep 23, 2009 2:38 PM**	40	60
27	**Sep 23, 2009 2:58 PM**	40	60
28	**Sep 23, 2009 3:01 PM**	40	60
29	**Sep 23, 2009 5:50 PM**	45	55
30	**Sep 23, 2009 6:07 PM**	40	60
31	**Sep 23, 2009 7:07 PM**	30	70
32	**Sep 23, 2009 7:57 PM**	40	60
33	**Sep 23, 2009 10:43 PM**	70	30
34	**Sep 24, 2009 2:04 AM**	40	60
35	**Sep 24, 2009 10:13 AM**	5	95
36	**Sep 24, 2009 12:35 PM**	30	70

Minimum	0	10
Maximum	90	100
Median	40	60
Mode	40	60
Mean	37	63
# of Zeros	**1**	**0**

BRIDGE AND TUNNEL PROJECTS - "PROJECT PROGRESS" SUB-CRITERIA

Number	Response Date	Additional Local Match / Other Funding Availability (e.g., Private Investment)	Federal Mandates	Prior Commitment	Project Readiness
1	Sep 17, 2009 8:09 PM	25	30	20	25
2	Sep 17, 2009 8:57 PM	30	35	20	15
3	Sep 17, 2009 9:14 PM	10	30	50	10
4	Sep 18, 2009 12:38 PM	25	25	20	30
5	Sep 18, 2009 1:08 PM	15	50	20	15
6	Sep 18, 2009 1:42 PM	100	0	0	0
7	Sep 18, 2009 2:31 PM	5	85	5	5
8	Sep 18, 2009 6:37 PM	15	35	25	25
9	Sep 20, 2009 10:43 PM	55	25	10	10
10	Sep 21, 2009 1:06 PM	0	50	0	50
11	Sep 21, 2009 1:52 PM	15	15	40	30
12	Sep 21, 2009 6:27 PM	55	15	5	25
13	Sep 21, 2009 6:34 PM	15	50	5	30
14	Sep 22, 2009 12:56 PM	30	30	10	30
15	Sep 22, 2009 5:13 PM	15	15	35	35
16	Sep 22, 2009 9:06 PM	10	60	15	15
17	Sep 22, 2009 9:09 PM	10	70	5	15
18	Sep 22, 2009 9:11 PM	30	20	40	10
19	Sep 22, 2009 9:13 PM	25	25	25	25
20	Sep 22, 2009 9:40 PM	25	40	25	10
21	Sep 23, 2009 11:53 AM	35	25	35	5
22	Sep 23, 2009 12:26 PM	60	10	10	20
23	Sep 23, 2009 12:37 PM	10	70	10	10
24	Sep 23, 2009 1:31 PM	25	25	25	25
25	Sep 23, 2009 2:32 PM	25	25	25	25
26	Sep 23, 2009 2:38 PM	35	35	20	10
27	Sep 23, 2009 2:58 PM	40	0	0	60
28	Sep 23, 2009 3:01 PM	40	0	0	60
29	Sep 23, 2009 5:50 PM	40	10	20	30
30	Sep 23, 2009 6:07 PM	40	0	0	60
31	Sep 23, 2009 7:07 PM	30	30	20	20
32	Sep 23, 2009 7:57 PM	40	0	0	60
33	Sep 23, 2009 10:43 PM	20	30	25	25
34	Sep 24, 2009 2:04 AM	10	40	30	20
35	Sep 24, 2009 10:13 AM	40	30	10	20
36	Sep 24, 2009 12:35 PM	5	15	50	30

Minimum	0	0	0	0
Maximum	100	85	50	60
Median	25	27.5	20	25
Mode	25	30	20	25
Mean	28	29	18	25
# of Zeros	**1**	**5**	**6**	**1**

BRIDGE AND TUNNEL PROJECTS - "SAFETY AND SECURITY" SUB-CRITERIA

Number	Response Date	Crash Rate	Improvement to Geometric Deficiencies	Improvements to Incident Management or Evacuation Routes	Failure Impact
1	**Sep 17, 2009 8:09 PM**	25	20	30	25
2	**Sep 17, 2009 8:57 PM**	25	20	35	20
3	**Sep 17, 2009 9:14 PM**	20	15	50	15
4	**Sep 18, 2009 12:38 PM**	25	20	35	20
5	**Sep 18, 2009 1:08 PM**	25	20	15	40
6	**Sep 18, 2009 1:42 PM**	40	0	20	40
7	**Sep 18, 2009 2:31 PM**	30	5	60	5
8	**Sep 18, 2009 6:37 PM**	40	15	5	40
9	**Sep 20, 2009 10:43 PM**	25	25	25	25
10	**Sep 21, 2009 1:06 PM**	50	0	0	50
11	**Sep 21, 2009 1:52 PM**	35	25	25	15
12	**Sep 21, 2009 6:27 PM**	30	5	25	40
13	**Sep 21, 2009 6:34 PM**	20	10	40	30
14	**Sep 22, 2009 12:56 PM**	30	20	20	30
15	**Sep 22, 2009 5:13 PM**	10	10	10	70
16	**Sep 22, 2009 9:06 PM**	25	20	35	20
17	**Sep 22, 2009 9:09 PM**	10	5	15	70
18	**Sep 22, 2009 9:11 PM**	30	20	30	20
19	**Sep 22, 2009 9:13 PM**	20	30	30	20
20	**Sep 22, 2009 9:40 PM**	10	10	40	40
21	**Sep 23, 2009 11:53 AM**	30	10	30	30
22	**Sep 23, 2009 12:26 PM**	20	30	10	40
23	**Sep 23, 2009 12:37 PM**	20	20	10	50
24	**Sep 23, 2009 1:31 PM**	30	30	30	10
25	**Sep 23, 2009 2:32 PM**	25	15	30	30
26	**Sep 23, 2009 2:38 PM**	25	20	30	25
27	**Sep 23, 2009 2:58 PM**	50	0	25	25
28	**Sep 23, 2009 3:01 PM**	50	0	25	25
29	**Sep 23, 2009 5:50 PM**	20	15	30	35
30	**Sep 23, 2009 6:07 PM**	50	0	25	25
31	**Sep 23, 2009 7:07 PM**	20	20	30	30
32	**Sep 23, 2009 7:57 PM**	50	0	25	25
33	**Sep 23, 2009 10:43 PM**	30	20	25	25
34	**Sep 24, 2009 2:04 AM**	20	20	40	20
35	**Sep 24, 2009 10:13 AM**	30	20	20	30
36	**Sep 24, 2009 12:35 PM**	25	15	10	50

Minimum	10	0	0	5
Maximum	50	30	60	70
Median	25	17.5	25	27.5
Mode	25	20	30	25
Mean	28	15	26	31
# of Zeros	**0**	**6**	**1**	**0**

Bike and Ped Projects		Very Important	Somewhat Important	Neutral	Somewhat Not Imp.	Very Not Imp.	Weighted Score
Points		5	4	3	2	1	
Safety	**Safety**	18	13	4	1	1	157
System	**System Continuity and**	22	9	5	0	1	162
Air	**Air Quality/Emissions**	3	7	12	11	4	105
Cost	**Cost Effectiveness**	11	8	10	6	2	131
Enhances	**Enhances Other Categories**	6	13	12	3	3	127
Progress	**Project Progress**	5	8	15	8	1	119

Level of Importance:

System Continuity and Connectivity	162
Safety	157
Cost Effectiveness	131
Enhances Other Categories	127
Project Progress	119
Air Quality/Emissions Reduction	105

BIKE AND PED PROJECTS - MAIN CRITERIA WEIGHTING FACTORS

Number	Response Date	Safety	System Continuity and Connectivity	Air Quality/Emissions Reduction	Cost Effectiveness	Enhances Other Categories	Project Progress
1	Sep 17, 2009 8:04 PM	20	20	15	15	15	15
2	Sep 17, 2009 8:44 PM	20	25	5	20	20	10
3	Sep 17, 2009 8:49 PM	20	20	20	10	20	10
4	Sep 17, 2009 9:07 PM	25	25	20	15	10	5
5	Sep 18, 2009 12:10 PM	20	20	10	10	20	20
6	Sep 18, 2009 12:57 PM	35	25	10	15	5	10
7	Sep 18, 2009 1:39 PM	20	20	20	20	20	0
8	Sep 18, 2009 2:22 PM	25	30	0	5	15	25
9	Sep 20, 2009 10:40 PM	20	20	20	20	10	10
10	Sep 21, 2009 12:49 PM	28	20	10	27	10	5
11	Sep 21, 2009 1:00 PM	0	50	0	50	0	0
12	Sep 21, 2009 6:18 PM	20	20	10	10	15	25
13	Sep 21, 2009 6:21 PM	40	10	5	5	40	0
14	Sep 22, 2009 12:37 PM	20	10	10	35	15	10
15	Sep 22, 2009 12:42 PM	25	25	10	20	15	5
16	Sep 22, 2009 5:01 PM	20	25	0	25	15	15
17	Sep 22, 2009 9:03 PM	20	10	20	20	15	15
18	Sep 22, 2009 9:06 PM	20	15	15	25	10	15
19	Sep 22, 2009 9:06 PM	40	30	20	0	0	10
20	Sep 22, 2009 9:08 PM	30	30	10	10	10	10
21	Sep 22, 2009 9:08 PM	30	5	5	40	15	5
22	Sep 23, 2009 11:41 AM	15	40	10	15	15	5
23	Sep 23, 2009 12:00 PM	30	20	0	20	10	20
24	Sep 23, 2009 12:31 PM	30	20	20	10	10	10
25	Sep 23, 2009 1:24 PM	20	20	20	20	10	10
26	Sep 23, 2009 1:57 PM	15	25	15	10	15	20
27	Sep 23, 2009 2:28 PM	30	30	10	15	10	5
28	Sep 23, 2009 2:56 PM	20	50	5	5	5	15
29	Sep 23, 2009 2:58 PM	20	50	5	5	5	15
30	Sep 23, 2009 5:17 PM	25	25	5	15	25	5
31	Sep 23, 2009 6:06 PM	20	50	5	5	5	15
32	Sep 23, 2009 7:06 PM	15	25	10	10	25	15
33	Sep 23, 2009 7:54 PM	20	50	5	5	10	10
34	Sep 23, 2009 10:32 PM	20	20	10	15	15	20
35	Sep 24, 2009 1:48 AM	20	5	20	30	20	5
36	Sep 24, 2009 10:08 AM	25	10	5	25	10	25
37	Sep 24, 2009 12:12 PM	35	25	10	15	10	5

Minimum		0	5	0	0	0	0
Maximum		40	50	20	50	40	25
Median		20	25	10	15	15	10
Mode		20	20	10	15	10	10
Mean		23	25	11	17	13	11
# of Zeros		**1**	**0**	**4**	**1**	**2**	**3**

1 RESPONDENT ANSWERED THIS ONE ONLY

BIKE AND PED PROJECTS - "PROJECT PROGRESS" SUB-CRITERIA

Number	Response Date	Additional Local Match / Other Funding Availability	Federal Mandates	Prior Commitment	Project Readiness
1	**Sep 17, 2009 8:05 PM**	20	35	25	20
2	**Sep 17, 2009 8:47 PM**	35	25	20	20
3	**Sep 17, 2009 8:52 PM**	30	30	10	30
4	**Sep 17, 2009 9:09 PM**	0	0	100	0
5	**Sep 18, 2009 12:32 PM**	20	5	30	45
6	**Sep 18, 2009 1:00 PM**	30	50	15	5
7	**Sep 18, 2009 1:39 PM**	50	50	0	0
8	**Sep 18, 2009 2:24 PM**	5	60	10	25
9	**Sep 20, 2009 10:41 PM**	25	25	25	25
10	**Sep 21, 2009 12:54 PM**	10	30	30	30
11	**Sep 21, 2009 1:03 PM**	0	75	0	25
12	**Sep 21, 2009 6:21 PM**	0	40	10	50
13	**Sep 21, 2009 6:23 PM**	30	40	10	20
14	**Sep 22, 2009 12:39 PM**	25	25	25	25
15	**Sep 22, 2009 12:45 PM**	10	30	40	20
16	**Sep 22, 2009 5:07 PM**	10	10	30	50
17	**Sep 22, 2009 9:04 PM**	15	70	0	15
18	**Sep 22, 2009 9:06 PM**	35	40	10	15
19	**Sep 22, 2009 9:08 PM**	50	20	10	20
20	**Sep 22, 2009 9:10 PM**	10	30	30	30
21	**Sep 22, 2009 9:25 PM**	60	20	10	10
22	**Sep 23, 2009 11:44 AM**	30	25	25	20
23	**Sep 23, 2009 12:02 PM**	30	20	20	30
24	**Sep 23, 2009 12:32 PM**	20	40	20	20
25	**Sep 23, 2009 1:25 PM**	25	25	25	25
26	**Sep 23, 2009 2:01 PM**	20	30	20	30
27	**Sep 23, 2009 2:32 PM**	30	35	25	10
28	**Sep 23, 2009 2:57 PM**	30	10	30	30
29	**Sep 23, 2009 2:59 PM**	30	10	30	30
30	**Sep 23, 2009 5:41 PM**	35	10	25	30
31	**Sep 23, 2009 6:06 PM**	30	10	30	30
32	**Sep 23, 2009 7:06 PM**	30	20	30	20
33	**Sep 23, 2009 7:54 PM**	30	10	30	30
34	**Sep 23, 2009 10:32 PM**	20	30	30	20
35	**Sep 24, 2009 1:51 AM**	20	30	20	30
36	**Sep 24, 2009 10:10 AM**	25	20	25	30
37	**Sep 24, 2009 12:16 PM**	5	25	40	30

Minimum	0	0	0	0
Maximum	60	75	100	50
Median	25	25	25	25
Mode	30	30	30	30
Mean	24	29	23	24
# of Zeros	**3**	**1**	**3**	**2**

1 RESPONDENT ANSWERED THIS ONE ONLY

BIKE AND PED PROJECTS - "SAFETY" SUB-CRITERIA

Number	Response Date	Crash History	Safety Improvement
1	**Sep 17, 2009 8:05 PM**	25	75
2	**Sep 17, 2009 8:47 PM**	55	45
3	**Sep 17, 2009 8:52 PM**	70	30
4	**Sep 17, 2009 9:09 PM**	50	50
5	**Sep 18, 2009 12:32 PM**	40	60
6	**Sep 18, 2009 1:00 PM**	60	40
7	**Sep 18, 2009 1:39 PM**	25	75
8	**Sep 18, 2009 2:24 PM**	50	50
9	**Sep 20, 2009 10:41 PM**	50	50
10	**Sep 21, 2009 12:54 PM**	65	35
11	**Sep 21, 2009 1:03 PM**	100	0
12	**Sep 21, 2009 6:21 PM**	50	50
13	**Sep 21, 2009 6:23 PM**	50	50
14	**Sep 22, 2009 12:39 PM**	50	50
15	**Sep 22, 2009 12:45 PM**	50	50
16	**Sep 22, 2009 5:07 PM**	34	66
17	**Sep 22, 2009 9:04 PM**	50	50
18	**Sep 22, 2009 9:06 PM**	35	65
19	**Sep 22, 2009 9:08 PM**	70	30
20	**Sep 22, 2009 9:10 PM**	50	50
21	**Sep 22, 2009 9:25 PM**	40	60
22	**Sep 23, 2009 11:44 AM**	40	60
23	**Sep 23, 2009 12:02 PM**	40	60
24	**Sep 23, 2009 12:32 PM**	60	40
25	**Sep 23, 2009 1:25 PM**	50	50
26	**Sep 23, 2009 2:01 PM**	25	75
27	**Sep 23, 2009 2:32 PM**	60	40
28	**Sep 23, 2009 2:57 PM**	50	50
29	**Sep 23, 2009 2:59 PM**	50	50
30	**Sep 23, 2009 5:41 PM**	60	40
31	**Sep 23, 2009 6:06 PM**	50	50
32	**Sep 23, 2009 7:06 PM**	25	75
33	**Sep 23, 2009 7:54 PM**	50	50
34	**Sep 23, 2009 10:32 PM**	55	45
35	**Sep 24, 2009 1:51 AM**	50	50
36	**Sep 24, 2009 10:10 AM**	50	50
37	**Sep 24, 2009 12:16 PM**	75	25

Minimum	25	0
Maximum	100	75
Median	50	50
Mode	50	50
Mean	50	50
# of Zeros	**0**	**1**

1 RESPONDENT ANSWERED THIS ONE ONLY

BIKE AND PED PROJECTS - "SYSTEM CONTINUITY & CONNECTIVITY " SUB-CRITERIA

Number	Response Date	Regional Significance	Elimination of barriers to major destinations	Connections to Existing Facilities	Access to transit, local or regional destinations (such as schools, commercial/employment centers, or recreational facilities), or high density residential areas	Population Served
1	**Sep 17, 2009 8:05 PM**	10	30	30	15	15
2	**Sep 17, 2009 8:47 PM**	15	20	20	30	15
3	**Sep 17, 2009 8:52 PM**	10	30	20	20	20
4	**Sep 17, 2009 9:09 PM**	0	30	20	40	10
5	**Sep 18, 2009 12:32 PM**	15	20	20	30	15
6	**Sep 18, 2009 1:00 PM**	10	25	20	30	15
7	**Sep 18, 2009 1:39 PM**	0	0	100	0	0
8	**Sep 18, 2009 2:24 PM**	5	20	40	20	15
9	**Sep 20, 2009 10:41 PM**	10	10	30	30	20
10	**Sep 21, 2009 12:54 PM**	10	20	25	25	20
11	**Sep 21, 2009 1:03 PM**	0	50	0	0	50
12	**Sep 21, 2009 6:21 PM**	5	10	40	40	5
13	**Sep 21, 2009 6:23 PM**	0	20	30	35	15
14	**Sep 22, 2009 12:39 PM**	20	20	20	20	20
15	**Sep 22, 2009 12:45 PM**	15	30	30	15	10
16	**Sep 22, 2009 5:07 PM**	5	20	35	35	5
17	**Sep 22, 2009 9:04 PM**	15	20	20	25	20
18	**Sep 22, 2009 9:06 PM**	25	10	15	40	10
19	**Sep 22, 2009 9:08 PM**	0	20	10	50	20
20	**Sep 22, 2009 9:10 PM**	10	30	10	30	20
21	**Sep 22, 2009 9:25 PM**	10	30	30	30	0
22	**Sep 23, 2009 11:44 AM**	10	10	30	30	20
23	**Sep 23, 2009 12:02 PM**	20	20	30	20	10
24	**Sep 23, 2009 12:32 PM**	20	20	20	20	20
25	**Sep 23, 2009 1:25 PM**	20	20	20	20	20
26	**Sep 23, 2009 2:01 PM**	20	10	30	25	15
27	**Sep 23, 2009 2:32 PM**	10	20	25	25	20
28	**Sep 23, 2009 2:57 PM**	10	10	20	50	10
29	**Sep 23, 2009 2:59 PM**	10	10	20	50	10
30	**Sep 23, 2009 5:41 PM**	10	20	20	35	15
31	**Sep 23, 2009 6:06 PM**	10	10	20	50	10
32	**Sep 23, 2009 7:06 PM**	10	25	30	25	10
33	**Sep 23, 2009 7:54 PM**	10	10	20	50	10
34	**Sep 23, 2009 10:32 PM**	10	10	30	40	10
35	**Sep 24, 2009 1:51 AM**	10	25	30	20	15
36	**Sep 24, 2009 10:10 AM**	25	15	20	20	20
37	**Sep 24, 2009 12:16 PM**	10	20	25	40	5

Minimum	0	0	0	0	0
Maximum	25	50	100	50	50
Median	10	20	20	30	15
Mode	10	20	20	20	20
Mean	11	19	26	29	15
# of Zeros	**5**	**1**	**1**	**2**	**2**

1 RESPONDENT ANSWERED THIS ONE ONLY

Systems Management, TDM, and Operational Improvement Projects	Very Important	Somewhat Important	Neutral	Somewhat Not Imp.	Very Not Imp.	Weighted Score
Points	5	4	3	2	1	
Congestion Level	20	13	3	0	0	161
Regional Significance	10	11	10	4	1	133
Safety	10	11	14	0	1	137
Air Quality/Emissions Reduction	17	9	3	5	2	142
Cost Effectiveness	11	18	6	1	0	147
Enhances Other Categories	5	8	13	8	2	114
Project Progress	5	10	16	4	1	122

Level of Importance:

Congestion Level	161
Cost Effectiveness	147
Air Quality/Emissions Reduction	142
Safety	137
Regional Significance	133
Project Progress	122
Enhances Other Categories	114

SYS MNGMT/TDM/OP IMP PROJECTS - MAIN CRITERIA WEIGHTING FACTORS

Number	Response Date	Congestion Level	Regional Significance	Safety	Air Quality/Emissions Reduction	Cost Effectiveness	Enhances Other Categories	Project Progress
1	Sep 17, 2009 8:14 PM	20	15	15	15	15	10	10
2	Sep 17, 2009 9:11 PM	20	10	20	5	15	15	15
3	Sep 17, 2009 9:23 PM	20	15	20	15	10	10	10
4	Sep 18, 2009 12:46 PM	20	20	15	10	10	15	10
5	Sep 18, 2009 1:20 PM	25	10	25	0	20	15	5
6	Sep 18, 2009 1:52 PM	0	0	50	0	50	0	0
7	Sep 18, 2009 2:36 PM	25	10	15	25	5	15	5
8	Sep 18, 2009 6:56 PM	20	20	10	20	10	15	5
9	Sep 20, 2009 10:48 PM	30	5	5	20	30	5	5
10	Sep 21, 2009 1:18 PM	0	50	0	0	0	0	50
11	Sep 21, 2009 2:20 PM	25	5	15	5	25	10	15
12	Sep 21, 2009 6:37 PM	30	0	15	25	30	0	0
13	Sep 21, 2009 7:05 PM	25	5	10	15	15	5	25
14	Sep 22, 2009 1:22 PM	20	15	20	10	15	10	10
15	Sep 22, 2009 5:22 PM	15	5	10	35	15	10	10
16	Sep 22, 2009 9:11 PM	20	20	15	5	20	5	15
17	Sep 22, 2009 9:15 PM	20	10	20	20	10	10	10
18	Sep 22, 2009 9:21 PM	20	15	15	10	15	10	15
19	Sep 22, 2009 9:42 PM	25	25	25	10	15	0	0
20	Sep 22, 2009 9:54 PM	25	10	15	25	25	0	0
21	Sep 23, 2009 12:07 PM	15	15	10	30	10	10	10
22	Sep 23, 2009 12:35 PM	20	10	20	20	20	0	10
23	Sep 23, 2009 12:51 PM	25	25	10	10	10	10	10
24	Sep 23, 2009 1:40 PM	10	20	20	20	10	10	10
25	Sep 23, 2009 2:45 PM	25	20	20	10	10	10	5
26	Sep 23, 2009 2:47 PM	20	15	15	20	15	5	10
27	Sep 23, 2009 3:05 PM	20	20	0	40	20	0	0
28	Sep 23, 2009 3:15 PM	20	20	0	40	20	0	0
29	Sep 23, 2009 6:10 PM	20	20	0	40	20	0	0
30	Sep 23, 2009 7:09 PM	15	10	10	20	15	20	10
31	Sep 23, 2009 8:03 PM	20	20	0	40	20	0	0
32	Sep 23, 2009 8:13 PM	15	5	20	15	20	15	10
33	Sep 23, 2009 10:57 PM	5	20	5	15	15	20	20
34	Sep 24, 2009 2:11 AM	15	15	15	10	10	25	10
35	Sep 24, 2009 10:20 AM	15	25	15	10	10	15	10
36	Sep 24, 2009 12:59 PM	15	30	15	5	20	10	5

Minimum	0	0	0	0	0	0	0
Maximum	30	50	50	40	50	25	50
Median	20	15	15	15	15	10	10
Mode	20	20	15	10	15	10	10
Mean	19	15	14	17	17	9	9
# of Zeros	**2**	**2**	**5**	**3**	**1**	**10**	**8**

SYS MNGMT/TDM/OP IMP PROJECTS - TDM ONLY CRITERIA

Number	Response Date	Response Text
1	Sep 17, 2009 8:14 PM	20
2	Sep 17, 2009 9:11 PM	10
3	Sep 17, 2009 9:23 PM	0
4	Sep 18, 2009 12:46 PM	35
5	Sep 18, 2009 1:20 PM	0
6	Sep 18, 2009 1:52 PM	0
7	Sep 18, 2009 2:36 PM	0
8	Sep 18, 2009 6:56 PM	50
9	Sep 20, 2009 10:48 PM	25
10	Sep 21, 2009 1:18 PM	50
11	Sep 21, 2009 2:20 PM	30
12	Sep 21, 2009 6:37 PM	20
13	Sep 21, 2009 7:05 PM	40
14	Sep 22, 2009 1:22 PM	0
15	Sep 22, 2009 5:22 PM	25
16	Sep 22, 2009 9:11 PM	25
17	Sep 22, 2009 9:15 PM	50
18	Sep 22, 2009 9:21 PM	5
19	Sep 22, 2009 9:42 PM	60
20	Sep 22, 2009 9:54 PM	30
21	Sep 23, 2009 12:07 PM	15
22	Sep 23, 2009 12:35 PM	20
23	Sep 23, 2009 12:51 PM	50
24	Sep 23, 2009 1:40 PM	15
25	Sep 23, 2009 2:45 PM	20
26	Sep 23, 2009 2:47 PM	25
27	Sep 23, 2009 3:05 PM	50
28	Sep 23, 2009 3:15 PM	5
29	Sep 23, 2009 6:10 PM	15
30	Sep 23, 2009 7:09 PM	25
31	Sep 23, 2009 8:03 PM	10
32	Sep 23, 2009 8:13 PM	25
33	Sep 23, 2009 10:57 PM	80
34	Sep 24, 2009 2:11 AM	20
35	Sep 24, 2009 10:20 AM	10
36	Sep 24, 2009 12:59 PM	25

Minimum	0
Maximum	80
Median	22.5
Mode	25
Mean	25
# of Zeros	**5**

SYS MNGMT/TDM/OP IMP PROJECTS - "PROJECT ROGRESS" SUB-CRITERIA

Number	Response Date	Additional Local Match / Other Funding Availability	Federal Mandates	Prior Commitment	Project Readiness
1	Sep 17, 2009 8:15 PM	25	30	20	25
2	Sep 17, 2009 9:13 PM	30	30	20	20
3	Sep 17, 2009 9:25 PM	10	50	30	10
4	Sep 18, 2009 12:48 PM	25	25	25	25
5	Sep 18, 2009 1:22 PM	10	50	25	15
6	Sep 18, 2009 1:54 PM	50	50	0	0
7	Sep 18, 2009 2:37 PM	5	50	40	5
8	Sep 18, 2009 7:03 PM	20	40	25	15
9	Sep 20, 2009 10:49 PM	40	20	20	20
10	Sep 21, 2009 1:20 PM	0	50	0	50
11	Sep 21, 2009 2:26 PM	30	15	30	25
12	Sep 21, 2009 6:39 PM	30	25	20	25
13	Sep 21, 2009 7:07 PM	5	75	5	15
14	Sep 22, 2009 1:24 PM	30	30	20	20
15	Sep 22, 2009 5:34 PM	15	15	35	35
16	Sep 22, 2009 9:12 PM	20	60	10	10
17	Sep 22, 2009 9:22 PM	50	10	20	20
18	Sep 22, 2009 9:39 PM	10	70	5	15
19	Sep 22, 2009 9:43 PM	40	20	30	10
20	Sep 22, 2009 9:55 PM	50	10	20	20
21	Sep 23, 2009 12:09 PM	30	25	25	20
22	Sep 23, 2009 12:37 PM	30	10	30	30
23	Sep 23, 2009 12:52 PM	30	30	20	20
24	Sep 23, 2009 1:41 PM	30	30	30	10
25	Sep 23, 2009 2:47 PM	30	30	20	20
26	Sep 23, 2009 2:50 PM	25	25	25	25
27	Sep 23, 2009 3:06 PM	40	0	0	60
28	Sep 23, 2009 3:15 PM	40	0	0	60
29	Sep 23, 2009 6:10 PM	40	0	0	60
30	Sep 23, 2009 7:09 PM	20	20	30	30
31	Sep 23, 2009 8:04 PM	40	0	0	60
32	Sep 23, 2009 8:15 PM	40	10	20	30
33	Sep 23, 2009 11:00 PM	10	30	30	30
34	Sep 24, 2009 2:14 AM	30	30	10	30
35	Sep 24, 2009 10:21 AM	25	30	20	25
36	Sep 24, 2009 1:01 PM	5	20	50	25

Minimum	0	0	0	0
Maximum	50	75	50	60
Median	30	27.5	20	22.5
Mode	30	30	20	20
Mean	27	28	20	25
# of Zeros	**1**	**4**	**6**	**1**

SYS MNGMT/TDM/OP IMP PROJECTS - "REGIONAL SIGNIFICANCE" SUB-CRITERIA

Number	Response Date	Addresses Mobility or Accessibility Needs of Region	Improvements to Communications among Various Operating Agencies	Part of the Regional ITS Strategic Plan
1	**Sep 17, 2009 8:15 PM**	35	35	30
2	**Sep 17, 2009 9:13 PM**	30	30	40
3	**Sep 17, 2009 9:25 PM**	70	10	20
4	**Sep 18, 2009 12:48 PM**	25	25	50
5	**Sep 18, 2009 1:22 PM**	50	20	30
6	**Sep 18, 2009 1:54 PM**	0	25	75
7	**Sep 18, 2009 2:37 PM**	40	20	40
8	**Sep 18, 2009 7:03 PM**	40	20	40
9	**Sep 20, 2009 10:49 PM**	40	20	40
10	**Sep 21, 2009 1:20 PM**	0	0	100
11	**Sep 21, 2009 2:26 PM**	30	35	35
12	**Sep 21, 2009 6:39 PM**	35	45	20
13	**Sep 21, 2009 7:07 PM**	20	25	55
14	**Sep 22, 2009 1:24 PM**	50	20	30
15	**Sep 22, 2009 5:34 PM**	30	30	40
16	**Sep 22, 2009 9:12 PM**	60	20	20
17	**Sep 22, 2009 9:22 PM**	40	30	30
18	**Sep 22, 2009 9:39 PM**	35	30	35
19	**Sep 22, 2009 9:43 PM**	50	10	40
20	**Sep 22, 2009 9:55 PM**	50	40	10
21	**Sep 23, 2009 12:09 PM**	50	30	20
22	**Sep 23, 2009 12:37 PM**	50	40	10
23	**Sep 23, 2009 12:52 PM**	50	10	40
24	**Sep 23, 2009 1:41 PM**	40	30	30
25	**Sep 23, 2009 2:47 PM**	35	35	30
26	**Sep 23, 2009 2:50 PM**	40	20	40
27	**Sep 23, 2009 3:06 PM**	40	35	25
28	**Sep 23, 2009 3:15 PM**	40	35	25
29	**Sep 23, 2009 6:10 PM**	40	35	25
30	**Sep 23, 2009 7:09 PM**	50	10	40
31	**Sep 23, 2009 8:04 PM**	40	35	25
32	**Sep 23, 2009 8:15 PM**	50	30	20
33	**Sep 23, 2009 11:00 PM**	60	30	10
34	**Sep 24, 2009 2:14 AM**	30	30	40
35	**Sep 24, 2009 10:21 AM**	60	20	20
36	**Sep 24, 2009 1:01 PM**	50	15	35

Minimum	0	0	10
Maximum	70	45	100
Median	40	30	30
Mode	50	30	40
Mean	40	26	34
# of Zeros	**2**	**1**	**0**

SYS MNGMT/TDM/OP IMP PROJECTS - "TDM" SUB-CRITERIA

Number	Response Date	Number of Employers Offering TDM Programs	Percent of Employees Ridesharing	Percent of Employees Walking/Biking	Parking Management
1	Sep 17, 2009 8:15 PM	25	25	25	25
2	Sep 17, 2009 9:13 PM	40	15	20	25
3	Sep 17, 2009 9:25 PM	25	25	25	25
4	Sep 18, 2009 12:48 PM	35	25	15	25
5	Sep 18, 2009 1:22 PM	50	15	10	25
6	Sep 18, 2009 1:54 PM	0	50	50	0
7	Sep 18, 2009 2:37 PM	25	25	25	25
8	Sep 18, 2009 7:03 PM	25	25	25	25
9	Sep 20, 2009 10:49 PM	25	25	25	25
10	Sep 21, 2009 1:20 PM	100	0	0	0
11	Sep 21, 2009 2:26 PM	30	50	5	15
12	Sep 21, 2009 6:39 PM	30	30	20	20
13	Sep 21, 2009 7:07 PM	30	10	10	50
14	Sep 22, 2009 1:24 PM	30	10	10	50
15	Sep 22, 2009 5:34 PM	10	30	30	30
16	Sep 22, 2009 9:12 PM	25	25	25	25
17	Sep 22, 2009 9:22 PM	25	25	25	25
18	Sep 22, 2009 9:39 PM	25	30	30	15
19	Sep 22, 2009 9:43 PM	25	25	25	25
20	Sep 22, 2009 9:55 PM	30	20	20	30
21	Sep 23, 2009 12:09 PM	40	35	5	20
22	Sep 23, 2009 12:37 PM	20	30	30	20
23	Sep 23, 2009 12:52 PM	30	30	10	30
24	Sep 23, 2009 1:41 PM	25	25	25	25
25	Sep 23, 2009 2:47 PM	20	30	30	20
26	Sep 23, 2009 2:50 PM	25	25	25	25
27	Sep 23, 2009 3:06 PM	25	25	25	25
28	Sep 23, 2009 3:15 PM	25	25	25	25
29	Sep 23, 2009 6:10 PM	25	25	25	25
30	Sep 23, 2009 7:09 PM	50	20	15	15
31	Sep 23, 2009 8:04 PM	25	25	25	25
32	Sep 23, 2009 8:15 PM	20	30	20	30
33	Sep 23, 2009 11:00 PM	25	25	10	40
34	Sep 24, 2009 2:14 AM	30	30	20	20
35	Sep 24, 2009 10:21 AM	30	20	20	30
36	Sep 24, 2009 1:01 PM	25	25	25	25

Minimum	0	0	0	0
Maximum	100	50	50	50
Median	25	25	25	25
Mode	25	25	25	25
Mean	29	25	21	25
# of Zeros	**1**	**1**	**1**	**2**

Transit Projects	Very Important	Somewhat Important	Neutral	Somewhat Not Imp.	Very Not Imp.	Weighted Score
Points	5	4	3	2	1	
User Benefit	11	12	10	1	2	137
Existing Usage and/or Prospective Ridership and Coverage Area / Population Served	16	14	3	2	1	150
System Continuity and Connectivity	17	9	8	1	1	148
Air Quality/Emissions Reduction	7	9	9	7	4	116
Cost Effectiveness	11	9	7	8	1	129
Compatibility with existing land use patterns and future plans and development	13	9	8	4	2	135
Enhances Other Categories	3	12	13	6	2	116
Project Progress	2	9	17	6	2	111

Level of Importance:

Existing Usage and/or Prospective Ridership and Coverage Area / Population Served	150
System Continuity and Connectivity	148
User Benefit	137
Compatibility with existing land use patterns and future plans and development	135
Cost Effectiveness	129
Enhances Other Categories	116
Air Quality/Emissions Reduction	116
Project Progress	111

TRANSIT PROJECTS - MAIN CRITERIA WEIGHTING FACTORS

Number	Response Date	User Benefit	Existing Usage and/or Prospective Ridership and Coverage Area / Population Served	System Continuity and Connectivity	Air Quality/ Emissions Reduction	Cost Effectiveness	Compatibility with existing land use patterns and future plans and development	Enhances Other Categories	Project Progress
1	Sep 17, 2009 8:16 PM	15	15	15	10	10	20	5	10
2	Sep 17, 2009 9:16 PM	15	10	25	5	5	15	15	10
3	Sep 17, 2009 9:27 PM	15	25	20	0	5	25	10	0
4	Sep 18, 2009 12:50 PM	15	15	15	5	10	20	15	5
5	Sep 18, 2009 1:26 PM	25	15	5	0	30	5	20	0
6	Sep 18, 2009 1:57 PM	0	20	10	0	50	20	0	0
7	Sep 18, 2009 2:44 PM	15	15	15	15	5	20	10	5
8	Sep 18, 2009 7:25 PM	15	20	20	10	5	15	10	5
9	Sep 20, 2009 10:49 PM	10	10	10	20	20	10	10	10
10	Sep 21, 2009 1:21 PM	0	0	25	0	50	0	25	0
11	Sep 21, 2009 2:29 PM	5	5	15	10	30	25	5	5
12	Sep 21, 2009 6:40 PM	10	30	10	20	0	30	0	0
13	Sep 21, 2009 7:26 PM	15	15	10	5	30	10	0	15
14	Sep 22, 2009 1:27 PM	10	15	15	10	15	15	15	5
15	Sep 22, 2009 5:36 PM	10	25	10	5	25	10	10	5
16	Sep 22, 2009 9:14 PM	15	15	10	10	15	20	5	10
17	Sep 22, 2009 9:23 PM	10	10	10	10	20	20	10	10
18	Sep 22, 2009 9:41 PM	20	15	5	15	20	15	5	5
19	Sep 22, 2009 9:45 PM	20	25	30	10	15	0	0	0
20	Sep 22, 2009 9:59 PM	15	20	20	7	8	13	5	12
21	Sep 23, 2009 12:13 PM	15	20	20	10	7	15	8	5
22	Sep 23, 2009 12:41 PM	10	25	10	10	25	5	10	5
23	Sep 23, 2009 12:53 PM	20	20	20	10	10	5	10	5
24	Sep 23, 2009 1:43 PM	20	5	20	20	5	20	5	5
25	Sep 23, 2009 2:48 PM	15	20	25	10	5	5	15	5
26	Sep 23, 2009 2:53 PM	15	15	15	10	5	20	10	10
27	Sep 23, 2009 3:07 PM	5	40	40	5	0	5	0	5
28	Sep 23, 2009 3:16 PM	5	45	40	0	0	5	0	5
29	Sep 23, 2009 6:10 PM	5	40	40	5	0	5	0	5
30	Sep 23, 2009 7:10 PM	5	20	20	15	10	20	5	5
31	Sep 23, 2009 8:07 PM	5	40	35	10	0	5	0	5
32	Sep 23, 2009 8:22 PM	15	15	15	15	15	15	5	5
33	Sep 23, 2009 11:03 PM	15	10	15	15	10	15	10	10
34	Sep 24, 2009 2:18 AM	10	20	10	15	10	10	15	10
35	Sep 24, 2009 10:22 AM	10	15	15	5	15	15	15	10
36	Sep 24, 2009 1:04 PM	15	20	20	5	15	10	10	5

Minimum	0	0	5	0	0	0	0	0
Maximum	25	45	40	20	50	30	25	15
Median	15	17.5	15	10	10	15	10	5
Mode	15	15	15	10	5	20	10	5
Mean	12	19	18	9	14	13	8	6
# of Zeros	**2**	**1**	**0**	**5**	**5**	**2**	**8**	**6**

TRANSIT PROJECTS - "PROJECT PROGRESS" SUB-CRITERIA

Number	Response Date	Additional Local Match / Other Funding Availability	Federal Mandates	Prior Commitment	Project Readiness
1	**Sep 17, 2009 8:17 PM**	25	30	20	25
2	**Sep 17, 2009 9:17 PM**	30	30	20	20
3	**Sep 17, 2009 9:27 PM**	10	50	30	10
4	**Sep 18, 2009 12:51 PM**	25	25	25	25
5	**Sep 18, 2009 1:27 PM**	10	50	15	25
6	**Sep 18, 2009 1:58 PM**	50	50	0	0
7	**Sep 18, 2009 2:45 PM**	20	60	20	0
8	**Sep 18, 2009 7:26 PM**	30	40	15	15
9	**Sep 20, 2009 10:50 PM**	40	20	20	20
10	**Sep 21, 2009 1:21 PM**	0	50	0	50
11	**Sep 21, 2009 2:30 PM**	20	10	40	30
12	**Sep 21, 2009 6:41 PM**	30	30	10	30
13	**Sep 21, 2009 7:27 PM**	15	75	5	5
14	**Sep 22, 2009 1:28 PM**	30	30	20	20
15	**Sep 22, 2009 5:37 PM**	15	15	35	35
16	**Sep 22, 2009 9:15 PM**	20	60	10	10
17	**Sep 22, 2009 9:24 PM**	30	10	30	30
18	**Sep 22, 2009 9:42 PM**	15	70	5	10
19	**Sep 22, 2009 9:46 PM**	40	10	30	20
20	**Sep 22, 2009 10:00 PM**	35	15	35	15
21	**Sep 23, 2009 12:13 PM**	30	25	25	20
22	**Sep 23, 2009 12:42 PM**	70	10	10	10
23	**Sep 23, 2009 12:55 PM**	30	30	20	20
24	**Sep 23, 2009 1:44 PM**	40	30	10	20
25	**Sep 23, 2009 2:48 PM**	30	30	20	20
26	**Sep 23, 2009 2:54 PM**	25	25	25	25
27	**Sep 23, 2009 3:07 PM**	40	0	0	60
28	**Sep 23, 2009 3:17 PM**	40	0	0	60
29	**Sep 23, 2009 6:11 PM**	40	0	0	60
30	**Sep 23, 2009 7:10 PM**	20	20	30	30
31	**Sep 23, 2009 8:07 PM**	40	0	0	60
32	**Sep 23, 2009 8:23 PM**	35	20	25	20
33	**Sep 23, 2009 11:04 PM**	10	30	30	30
34	**Sep 24, 2009 2:18 AM**	30	30	10	30
35	**Sep 24, 2009 10:23 AM**	30	30	15	25
36	**Sep 24, 2009 1:05 PM**	20	5	50	25

Minimum	0	0	0	0
Maximum	70	75	50	60
Median	30	30	20	22.5
Mode	30	30	20	20
Mean	28	28	18	25
# of Zeros	**1**	**4**	**6**	**2**

TRANSIT PROJECTS - "SYSTEM CONTINUITY AND CONNECTIVITY" SUB-CRITERIA

Number	Response Date	Regional Significance	Improves access to employment and population centers
1	Sep 17, 2009 8:17 PM	50	50
2	Sep 17, 2009 9:17 PM	35	65
3	Sep 17, 2009 9:27 PM	50	50
4	Sep 18, 2009 12:51 PM	65	35
5	Sep 18, 2009 1:27 PM	40	60
6	Sep 18, 2009 1:58 PM	0	100
7	Sep 18, 2009 2:45 PM	50	50
8	Sep 18, 2009 7:26 PM	25	75
9	Sep 20, 2009 10:50 PM	50	50
10	Sep 21, 2009 1:21 PM	100	0
11	Sep 21, 2009 2:30 PM	35	65
12	Sep 21, 2009 6:41 PM	25	75
13	Sep 21, 2009 7:27 PM	5	95
14	Sep 22, 2009 1:28 PM	50	50
15	Sep 22, 2009 5:37 PM	75	25
16	Sep 22, 2009 9:15 PM	65	35
17	Sep 22, 2009 9:24 PM	50	50
18	Sep 22, 2009 9:42 PM	30	70
19	Sep 22, 2009 9:46 PM	40	60
20	Sep 22, 2009 10:00 PM	50	50
21	Sep 23, 2009 12:13 PM	25	75
22	Sep 23, 2009 12:42 PM	30	70
23	Sep 23, 2009 12:55 PM	80	20
24	Sep 23, 2009 1:44 PM	50	50
25	Sep 23, 2009 2:48 PM	60	40
26	Sep 23, 2009 2:54 PM	50	50
27	Sep 23, 2009 3:07 PM	40	60
28	Sep 23, 2009 3:17 PM	40	60
29	Sep 23, 2009 6:11 PM	40	60
30	Sep 23, 2009 7:10 PM	40	60
31	Sep 23, 2009 8:07 PM	40	60
32	Sep 23, 2009 8:23 PM	40	60
33	Sep 23, 2009 11:04 PM	50	50
34	Sep 24, 2009 2:18 AM	50	50
35	Sep 24, 2009 10:23 AM	75	25
36	Sep 24, 2009 1:05 PM	40	60

Minimum	0	0
Maximum	100	100
Median	45	55
Mode	50	50
Mean	46	54
# of Zeros	**1**	**1**

Intermodal Projects	Very Important	Somewhat Important	Neutral	Somewhat Not Imp.	Very Not Imp.	Weighted Score
Points	5	4	3	2	1	
Better Accommodates Intermodal Movements	22	10	3	0	1	160
Improves Rail or Vehicular Access to Freight	24	5	5	1	1	158
Cost Effectiveness	12	12	6	6	0	138
Enhances Other Categories	6	8	14	6	2	118
Project Progress	1	20	8	6	1	122

Level of Importance:

Better Accommodates Intermodal Movements	160
Improves Rail or Vehicular Access to Freight	158
Cost Effectiveness	138
Project Progress	122
Enhances Other Categories	118

INTERMODAL PROJECTS - MAIN CRITERIA WEIGHTING FACTORS

Number	Response Date	Better Accommodates Intermodal Movements	Improves Rail or Vehicular Access to Freight Distribution Facilities, Airports/Seaports, Major Industrial Clients, Employment and Population Centers, or Rail Stations/Terminals	Cost Effectiveness	Enhances Other Categories	Project Progress
1	Sep 17, 2009 8:11 PM	25	25	20	15	15
2	Sep 17, 2009 9:05 PM	25	15	15	30	15
3	Sep 17, 2009 9:20 PM	35	30	20	15	0
4	Sep 18, 2009 12:43 PM	30	20	20	15	15
5	Sep 18, 2009 1:16 PM	15	10	30	40	5
6	Sep 18, 2009 1:50 PM	0	0	100	0	0
7	Sep 18, 2009 2:34 PM	35	20	20	20	5
8	Sep 18, 2009 6:45 PM	40	20	10	20	10
9	Sep 20, 2009 10:46 PM	30	20	25	20	5
10	Sep 21, 2009 1:15 PM	50	0	50	0	0
11	Sep 21, 2009 2:12 PM	10	30	30	15	15
12	Sep 21, 2009 6:35 PM	25	25	20	15	15
13	Sep 21, 2009 6:52 PM	15	5	35	5	40
14	Sep 22, 2009 1:17 PM	20	30	20	15	15
15	Sep 22, 2009 5:19 PM	25	15	35	15	10
16	Sep 22, 2009 9:08 PM	30	30	15	5	20
17	Sep 22, 2009 9:13 PM	25	25	25	10	15
18	Sep 22, 2009 9:18 PM	5	50	20	5	20
19	Sep 22, 2009 9:40 PM	35	35	10	10	10
20	Sep 22, 2009 9:49 PM	30	30	10	10	20
21	Sep 23, 2009 12:04 PM	20	40	15	20	5
22	Sep 23, 2009 12:32 PM	30	10	30	10	20
23	Sep 23, 2009 12:49 PM	30	20	20	10	20
24	Sep 23, 2009 1:37 PM	25	25	15	20	15
25	Sep 23, 2009 2:44 PM	35	25	15	20	5
26	Sep 23, 2009 2:45 PM	25	25	20	15	15
27	Sep 23, 2009 3:00 PM	45	45	0	0	10
28	Sep 23, 2009 3:04 PM	45	45	0	0	10
29	Sep 23, 2009 6:09 PM	45	45	0	0	10
30	Sep 23, 2009 7:09 PM	30	20	20	15	15
31	Sep 23, 2009 8:01 PM	45	45	0	0	10
32	Sep 23, 2009 8:08 PM	20	30	30	10	10
33	Sep 23, 2009 10:52 PM	10	40	35	5	10
34	Sep 24, 2009 2:07 AM	20	20	20	20	20
35	Sep 24, 2009 10:18 AM	15	50	15	10	10
36	Sep 24, 2009 12:49 PM	5	50	15	20	10

Minimum	0	0	0	0	0
Maximum	50	50	100	40	40
Median	25	25	20	15	10
Mode	25	20	20	15	10
Mean	26	27	22	13	12
# of Zeros	**1**	**2**	**4**	**6**	**3**

INTERMODAL PROJECTS - "PROJECT PROGRESS" SUB-CRITERIA

Number	Response Date	Additional Local Match / Other Funding Availability (e.g., Private Investment)	Federal Mandates	Prior Commitment	Project Readiness
1	Sep 17, 2009 8:12 PM	25	30	20	25
2	Sep 17, 2009 9:05 PM	30	30	20	20
3	Sep 17, 2009 9:20 PM	10	70	10	10
4	Sep 18, 2009 12:43 PM	25	25	25	25
5	Sep 18, 2009 1:16 PM	10	50	25	15
6	Sep 18, 2009 1:50 PM	50	50	0	0
7	Sep 18, 2009 2:35 PM	20	75	5	0
8	Sep 18, 2009 6:50 PM	25	40	20	15
9	Sep 20, 2009 10:46 PM	40	20	20	20
10	Sep 21, 2009 1:16 PM	0	50	0	50
11	Sep 21, 2009 2:13 PM	35	10	35	20
12	Sep 21, 2009 6:36 PM	70	20	5	5
13	Sep 21, 2009 6:52 PM	10	50	5	35
14	Sep 22, 2009 1:17 PM	30	30	20	20
15	Sep 22, 2009 5:19 PM	15	15	35	35
16	Sep 22, 2009 9:08 PM	20	60	10	10
17	Sep 22, 2009 9:13 PM	15	70	5	10
18	Sep 22, 2009 9:19 PM	50	15	15	20
19	Sep 22, 2009 9:41 PM	40	20	30	10
20	Sep 22, 2009 9:50 PM	50	10	10	30
21	Sep 23, 2009 12:04 PM	35	25	25	15
22	Sep 23, 2009 12:33 PM	30	10	25	35
23	Sep 23, 2009 12:49 PM	40	20	20	20
24	Sep 23, 2009 1:37 PM	25	25	25	25
25	Sep 23, 2009 2:44 PM	30	30	20	20
26	Sep 23, 2009 2:45 PM	25	25	25	25
27	Sep 23, 2009 3:00 PM	40	0	0	60
28	Sep 23, 2009 3:04 PM	40	0	0	60
29	Sep 23, 2009 6:09 PM	40	0	0	60
30	Sep 23, 2009 7:09 PM	20	20	30	30
31	Sep 23, 2009 8:01 PM	40	0	0	60
32	Sep 23, 2009 8:09 PM	35	15	20	30
33	Sep 23, 2009 10:53 PM	30	40	10	20
34	Sep 24, 2009 2:08 AM	30	30	10	30
35	Sep 24, 2009 10:18 AM	20	35	15	30
36	Sep 24, 2009 12:50 PM	5	20	50	25

Minimum	0	0	0	0
Maximum	70	75	50	60
Median	30	25	20	22.5
Mode	40	20	20	20
Mean	29	29	16	26
# of Zeros	**1**	**4**	**6**	**2**

Appendix F

Detailed Weighting Factors and Measures of Effectiveness for the HRTPO Program Prioritization Methodology

"Highways" Projects

Evaluation Criterion	Points	Scoring Instructions
Project Utility – 100 Points Total		
Congestion Level	0-30	Scoring based on both the degree of existing congestion within the project area and the project's potential to improve congestion levels after construction. Points are awarded according to three subcriteria: • (10.00 points possible) Percent Reduction of Existing Volume-to-Capacity (V/C) Ratios o 10.00 points awarded if the projected future V/C ratio is 50% or less of the existing V/C ratio o 0.00 points awarded if the future V/C is greater than or equal to the existing V/C ratio o Projected reductions less than 50% but greater than 0% are awarded points between 10.00 and 0.00 using straight-line interpolation • (10.00 points possible) Existing V/C Ratio o 10.00 points awarded if the existing V/C is greater than 1.0, which implies a roadway is over capacity o 5.00 points awarded if the existing V/C is less than or equal to 1.0 but greater than or equal to 0.85, which implies heavy congestion o 0.00 points awarded if the existing V/C is less than 0.85, which implies acceptable congestion levels • (10.00 points possible) Impact to Nearby Roadways (i.e., the volume of traffic that will be attracted to the project roadway from adjacent roadways as a result of construction) o 10.00 points awarded if the projected volume attracted from adjacent roadways is greater than or equal to 30,000 vehicles per day (which equates to a new 4-lane facility) o 0.00 points awarded if the projected volume attracted from adjacent roadways is 0 vehicles per day or if the existing traffic volume on the project roadway is anticipated to decrease o Projected volumes less than 30,000 vehicles per day but greater than 0 are awarded points between 10.00 and 0.00 using straight-line interpolation
System Continuity and Connectivity	8.25-25	Scoring based on the degree to which a project will impact the continuity and connectivity of the region's transportation network • 25.00 points awarded if the project is expected to improve connectivity and continuity on a regional level (project would have to be regionally significant with regards to connectivity and continuity and provide considerable benefit to the regional transportation system) • 16.75 points awarded if the project is expected to improve connectivity and continuity on a multijurisdictional level (provide benefit to at least two local jurisdictions) • 8.25 points awarded if the project is expected to improve connectivity and continuity on a local level (benefit to only one jurisdiction)

Cost Effectiveness	0-15	Scoring based on the ratio of the overall cost of the project with respect to the number of users the project will serve (measured in vehicle-miles traveled [VMT] throughout the project study area) • 15.00 points awarded if the projected ratio of construction cost to VMT is less than or equal to $500 per VMT • 0.00 points awarded if the projected ratio of construction cost to VMT is greater than or equal to $2,500 per VMT • Projected ratios greater than $500 per VMT but less than $2,500 per VMT are awarded points between 15.00 and 0.00 using straight-line interpolation
Compatibility with Existing Land Use Patterns and Future Plans and Development	0-10	Scoring based on the degree to which a project is compatible with existing land use patterns and future development plans • 10.00 points awarded if the project is compatible with existing land use patterns and future plans and has been formally adopted by a body of elected officials (such as part of a comprehensive plan) • 5.00 points awarded if the project is compatible with existing land use patterns and future plans but has not been formally adopted by a body of elected officials. • 0.00 points awarded if the project is not compatible with existing land uses and future development

Safety and Security	0-10	Scoring based on a project's impact to evacuation/incident management routes and its potential to improve safety. Points are awarded according to three subcriteria: • (4.00 points possible) Critical Crash Ratio (CCR) – calculated by taking the ratio of the actual crash rate for the project area to the average jurisdictional crash rate for where the project resides o 4.00 points awarded if the CCR is greater than or equal to 2.0, which implies that the actual crash ratio is at least twice the average rate o 0.00 points awarded if the CCR is less than or equal to 1.0, which implies that the actual crash rate is less than or equal to the average crash rate o Projects with a CCR less than 2.0 but greater than 1.0 are awarded points between 4.00 and 0.00 using straight-line interpolation • (3.00 points possible) Improvement of Geometric Deficiencies (physical roadway features that do not meet current design standards such as horizontal or vertical alignment, sight distance, lane/shoulder widths, etc.) o 3.00 points awarded if the project is expected to correct three or more geometric deficiencies OR the project will be brought up to standard o 2.25 points awarded if the project is expected to correct two or more geometric deficiencies in the project area but will not bring the project up to standard o 1.50 points awarded if the project is expected to correct one geometric deficiency in the project area o 0.00 points awarded if the project is not expected to correct any geometric deficiencies in the project area (i.e., the proposed project is either new or addresses an issue such as capacity, which is not a safety issue) • (3.00 points possible) Improvement to Incident Management or Evacuation Routes o 3.00 points awarded if the project roadway is part of an established and documented incident management or evacuation route o 0.00 points awarded if the project is **not** part of an established and documented incident management or evacuation route
Infrastructure Condition	0-5	Scoring based on the Critical Condition Index (CCI), which is a numerical value ranging between 1 and 100 assigned to a roadway to describe its physical condition. • 5.00 points awarded if the pavement condition is classified as Very Poor (CCI less than 50) • 3.75 points awarded if the pavement condition is classified as Poor (CCI between 50 and 59) • 2.50 points awarded if the pavement condition is classified as Fair (CCI between 60 and 69) • 1.25 points awarded if the pavement condition is classified as Good (CCI between 70 and 89) • 0.00 points awarded if the pavement condition is classified as Excellent (CCI greater than or equal to 90)

Modal Enhancements	0-5	Scoring based on a project's impact to other modes of transportation aside from personal vehicles. Points are awarded according to two subcriteria: • (2.00 points possible) Improving Vehicular Access to Freight Distribution Facilities, Ports, Major Industrial Clients, or Employment and Population Centers o 2.00 points awarded if the project improves access on a regional level (must include access to seaport, airport, military facility, inter-jurisdictional connection, or major industrial/ employment center) o 1.00 point awarded if the project improves access to these facilities but not on a regional level (such as to a local commerce park) o 0.00 points awarded if the project does not improve access to these facilities • (3.00 points possible) Enhances Other Categories (e.g., bus shelters, sidewalks or bike paths, water crossing, TDM initiative or ITS improvement, or intermodal movement) o 3.00 points awarded if the project will improve three or more categories o 2.00 points awarded if the project will improve two categories o 1.00 point awarded if the project will improve one category o 0.00 points awarded if the project will not improve any categories
Project Viability – 100 Points Total		
Amount of Additional Local Match or Private Funding Committed to the Project	0-40	Scoring based on the amount (in percentage of total project budget) of additional local match or private funding committed to the project beyond the required match. • 40.00 points awarded if committed funding is greater than or equal to 100% of the project budget • 32.50 points awarded if committed funding is less than 100% but greater than or equal to 80% of the project budget • 25.00 points awarded if committed funding is less than 80% but greater than or equal to 60% of the project budget • 15.00 points awarded if committed funding is less than 60% but greater than or equal to 40% of the project budget • 7.50 points awarded if committed funding is less than 40% but greater than or equal to 20% of the project budget • 0.00 points awarded if committed funding is less than 20% of the project budget
Prior Commitment	0-10	Scoring based on whether a project has prior commitment (i.e., inclusion in the current Long Range Transportation Plan [LRTP]). • 10.00 points awarded if the project is included in the current LRTP • 0.00 points awarded if the project is not included in the current LRTP

Federal Mandates	0-10	Scoring based on whether a project is backed by federal mandates (e.g., emergency bridge replacements, projects addressing significant existing design deficiencies, and projects with soon to expire federal funding previously allocated to the project) • 10.00 points awarded if the project is backed by documented federal mandates • 0.00 points awarded if the project is not backed by documented federal mandates
Degree of Project Readiness	0-40	Scoring based on how quickly a project could begin construction. Points are awarded cumulatively according to three components: • 15.00 points awarded if the design plans are complete and ready for advertisement, plus • 15.00 points awarded if the environmental plans/permits required for the project are complete, plus • 10.00 points awarded if the project is fully funded
Economic Vitality – 100 Points Total		
Total Reduction in Travel Time	0-30	Scoring based on a project's ability to decrease travel time for the entire region, as determined using HRTPO's travel demand model • Up to 30.00 points awarded based on a project's success in meeting this measure (specific thresholds are still under development)
Labor Market Access	0-20	Scoring based on the degree to which a project will reduce the effective distance that workers have to travel to get to work. Points are awarded according to two subcriteria: • (10.00 points possible) Increases Travel Time Reliability o Up to 10.00 points awarded based on level of service, number of incidents, and staff analysis of a project's ability to enhance travel time reliability (specific thresholds are still under development) • (10.00 points possible) Increases Access for Major Employment Centers o Up to 10.00 points awarded if the project will result in travel time savings for trips that end in TAZs with employment that is two standard deviations greater than the regional average (specific thresholds are still under development)

Addresses the Needs of Basic Sector Industries	0-30	Scoring based on the degree to which a project will provide or improve access to basic sector industries within Hampton Roads. Points are awarded according to three subcriteria: • (10.00 points possible) Increases Access for Defense Installations o Up to 10.00 points awarded if a project significantly reduces travel time for trips that end in TAZs with major military bases (specific thresholds are still under development) • (10.00 points possible) Increases Access to Tourist Destinations o Up to 10.00 points awarded if a project significantly reduces travel time for trips that end in TAZs with tourism employment that is more than one standard deviation greater than average tourism employment for the region (specific thresholds are still under development) • (10.00 points possible) Increases Access to Port Facilities o Up to 10.00 points awarded if a project significantly reduces travel time for trips that end in TAZs that provide critical access to a port (specific thresholds are still under development)
Increases Opportunity	0-20	Scoring based on a project's ability to bring in new dollars or businesses. Points are awarded according to two subcriteria: • (10.00 points possible) Provides New or Increased Access o 10.00 points awarded if a project provides new access to an area in a way that would encourage economic development in that area o 5.00 points awarded if a project provides increased access to an area in a way that would encourage economic development in that area o 0.00 points awarded if a project does not provide new or increased access to an area • (10.00 points possible) Supports Plans for Future Growth o 10.00 points awarded if a project is located in an area specifically designated as a growth area in local comprehensive plans. Staff will assess jurisdictional comprehensive plans to determine the relative score. o 5.00 points awarded if a project is supported by a jurisdictional comprehensive plan o 0.00 points awarded if a project is not supported by a jurisdictional comprehensive plan or located in a designated growth area as described above

"**Bridge/Tunnel" Projects**

Evaluation Criterion	Points	Scoring Instructions
Project Utility – 100 Points Total		
Congestion Level	0-30	Scoring based on both the degree of existing congestion within the project area and the project's potential to improve congestion levels after construction. Points are awarded according to three subcriteria: • (10.00 points possible) Percent Reduction of Existing Volume-to-Capacity (V/C) Ratios o 10.00 points awarded if the projected future V/C ratio is 50% or less of the existing V/C ratio o 0.00 points awarded if the future V/C is greater than or equal to the existing V/C ratio o Projected reductions less than 50% but greater than 0% are awarded points between 10.00 and 0.00 using straight-line interpolation • (10.00 points possible) Existing V/C Ratio o 10.00 points awarded if the existing V/C is greater than 1.0, which implies a roadway is over capacity o 5.00 points awarded if the existing V/C is less than or equal to 1.0 but greater than or equal to 0.85, which implies heavy congestion o 0.00 points awarded if the existing V/C is less than 0.85, which implies acceptable congestion levels • (10.00 points possible) Impact to Nearby Roadways (i.e. volume of traffic that will be attracted to the project roadway from adjacent roadways as a result of construction) o 10.00 points awarded if the projected volume attracted from adjacent roadways is greater than or equal to 30,000 vehicles per day (which equates to a new 4-lane facility) o 0.00 points awarded if the projected volume attracted from adjacent roadways is 0 vehicles per day or if the existing traffic volume on the project roadway is anticipated to decrease o Projected volumes less than 30,000 vehicles per day but greater than 0 are awarded points between 10.00 and 0.00 using straight-line interpolation
Compatibility with Existing Land Use Patterns and Future Plans and Development	0-10	Scoring based on the degree to which a project is compatible with existing land use patterns and future development plans • 10.00 points awarded if the project is compatible with existing land use patterns and future plans and has been formally adopted by a body of elected officials (such as part of a comprehensive plan) • 5.00 points awarded if the project is compatible with existing land use patterns and future plans but has not been formally adopted by a body of elected officials. • 0.00 points awarded if the project is not compatible with existing land uses and future development

Infrastructure Condition	0-20	Scoring based on the existing condition of the bridge or tunnel infrastructure. Points are awarded according to two subcriteria, one for bridges and one for tunnels: • (20.00 points possible) Bridge Sufficiency Rating (for bridge projects only) – scoring based on a nationwide system which assigns bridges point values between 0-100 to indicate structural condition o 20.00 points awarded if Bridge Sufficiency Rating is less than 50 (very poor condition) o 10.00 points awarded if Bridge Sufficiency Rating is greater than or equal to 50 but less than or equal to 80 o 0.00 points awarded if Bridge Sufficiency Rating is greater than 80 (excellent condition) • (20.00 points possible) Tunnel Condition (for tunnel projects only) – points are awarded cumulatively according to three components o 6.50 points awarded if the tunnel is more than 40 years old, plus o 6.75 points awarded if the last major repairs to the tunnel were completed more than 20 years ago, plus o 6.75 points awarded if the tunnel currently requires repairs costing more than $10 million or if the facility has never had a major repair
System Continuity and Connectivity	3.5-10	Scoring based on the degree to which a project will impact the continuity and connectivity of the region's transportation network • 10.00 points awarded if the project is expected to improve connectivity and continuity on a regional level (project would have to be regionally significant with regards to connectivity and continuity and provide considerable benefit to the regional transportation system) • 6.75 points awarded if the project is expected to improve connectivity and continuity on a multijurisdictional level (provide benefit to at least two local jurisdictions) • 3.50 points awarded if the project is expected to improve connectivity and continuity on a local level (benefit to only one jurisdiction)
Cost Effectiveness	0-15	Scoring based on the ratio of the overall cost of the project with respect to the number of users the project will serve (measured in vehicle-miles traveled [VMT] throughout the project study area) • 15.00 points awarded if the projected construction cost to VMT ratio is less than or equal to $2,000 per VMT • 0.00 points awarded if the projected construction cost to VMT ratio is greater than or equal to $20,000 per VMT • Projected ratios greater than $2,000 per VMT but less than $20,000 per VMT are awarded points between 15.00 and 0.00 using straight-line interpolation

Safety and Security	1-10	Scoring based on a project's impact to evacuation/incident management routes and its potential to improve safety. Points are awarded according to four subcriteria: • (2.50 points possible) Critical Crash Ratio (CCR) – calculated by taking the ratio of the actual crash rate for the project area to the average jurisdictional crash rate for where the project resides o 2.50 points awarded if the CCR is greater than or equal to 2.0, which implies that the actual crash ratio is at least twice the average rate o 0.00 points awarded if the CCR is less than or equal to 1.0, which implies that the actual crash rate is less than or equal to the average crash rate o Projects with a CCR less than 2.0 but greater than 1.0 are awarded points between 2.50 and 0.00 using straight-line interpolation • (2.00 points possible) Improvement of Geometric Deficiencies (physical roadway features that do not meet current design standards such as horizontal or vertical alignment, sight distance, lane/shoulder widths, etc.) o 2.00 points awarded if the project is expected to correct three or more geometric deficiencies OR the project will be brought up to standard o 1.50 points awarded if the project is expected to correct two or more geometric deficiencies in the project area but will not bring the project up to standard o 1.00 point awarded if the project is expected to correct one geometric deficiency in the project area o 0.00 points awarded if the project is not expected to correct any geometric deficiencies in the project area (i.e., the proposed project is either new or addresses an issue such as capacity, which is not a safety issue) • (3.00 points possible) Improvement to Incident Management or Evacuation Routes o 3.00 points awarded if the facility is part of an established and documented incident management or evacuation route o 0.00 points awarded if the facility is **not** part of an established and documented incident management or evacuation route • (2.50 points possible) Diversion Impact Due to Failure – calculated by multiplying the existing average daily traffic volume by the length of required detour and adding the current daily VMT along the route o 2.50 points awarded if failure of the facility will result in a detour of greater than 250,000 daily vehicle-miles (regional diversion impact) o 1.75 points awarded if failure of the facility will result in a detour of less than or equal to 250,000 daily vehicle-miles but greater than or equal to 10,000 daily vehicle-miles (multijurisdictional diversion impact) o 1.00 point awarded if the failure of the facility will result in a detour of less than 10,000 daily vehicle-miles (local diversion impact)

Modal Enhancements	0-5	Scoring based on a project's impact to other modes of transportation aside from personal vehicles. Points are awarded according to three subcriteria: • (2.00 points possible) Improving Vehicular Access to Freight Distribution Facilities, Ports, Major Industrial Clients, or Employment and Population Centers o 2.00 points awarded if the project improves access on a regional level (must include access to seaport, airport, military facility, inter-jurisdictional connection, or major industrial/ employment center) o 1.00 point awarded if the project improves access to these facilities but not on a regional level (such as to a local commerce park) o 0.00 points awarded if the project does not improve access to these facilities • (1.50 points possible) Enhances Other Categories (e.g., bus shelters, sidewalks or bike paths, HOV service, TDM initiative or ITS improvement, or intermodal movement) o 1.50 points awarded if the project will improve three or more categories o 1.00 point awarded if the project will improve two categories o 0.50 points awarded if the project will improve one category o 0.00 points awarded if the project will not improve any categories • (1.50 points possible) Continuous Maritime Crossing o 1.50 points awarded if the facility will provide an uninterrupted maritime crossing o 0.00 points awarded if the facility will cause interruptions of maritime operations
Project Viability – 100 Points Total		
Amount of Additional Local Match or Private Funding Committed to the Project	0-40	Scoring based on the amount (in percentage of total project budget) of additional local match or private funding committed to the project beyond the required match. • 40.00 points awarded if committed funding is greater than or equal to 100% of the project budget • 32.50 points awarded if committed funding is less than 100% but greater than or equal to 80% of the project budget • 25.00 points awarded if committed funding is less than 80% but greater than or equal to 60% of the project budget • 15.00 points awarded if committed funding is less than 60% but greater than or equal to 40% of the project budget • 7.50 points awarded if committed funding is less than 40% but greater than or equal to 20% of the project budget • 0.00 points awarded if committed funding is less than 20% of the project budget

Prior Commitment	0-10	Scoring based on whether a project has prior commitment (i.e., inclusion in the current Long Range Transportation Plan [LRTP]). • 10.00 points awarded if the project is included in the current LRTP • 0.00 points awarded if the project is not included in the current LRTP
Federal Mandates	0-10	Scoring based on whether a project is backed by federal mandates (e.g., emergency bridge replacements, projects addressing significant existing design deficiencies, and projects with soon to expire federal funding previously allocated to the project) • 10.00 points awarded if the project is backed by documented federal mandates • 0.00 points awarded if the project is not backed by documented federal mandates
Degree of Project Readiness	0-40	Scoring based on how quickly a project could begin construction. Points are awarded cumulatively according to three components: • 15.00 points awarded if the design plans are complete and ready for advertisement, plus • 15.00 points awarded if the environmental plans/permits required for the project are complete, plus • 10.00 points awarded if the project is fully funded
Economic Vitality – 100 Points Total		
Total Reduction in Travel Time	0-30	Scoring based on a project's ability to decrease travel time for the entire region, as determined using HRTPO's travel demand model • Up to 30.00 points awarded based on a project's success in meeting this measure (specific thresholds are still under development)
Labor Market Access	0-20	Scoring based on the degree to which a project will reduce the effective distance that workers have to travel to get to work. Points are awarded according to two subcriteria: • (10.00 points possible) Increases Travel Time Reliability o Up to 10.00 points awarded based on level of service, number of incidents, and staff analysis of a project's ability to enhance travel time reliability (specific thresholds are still under development) • (10.00 points possible) Increases Access for Major Employment Centers o Up to 10.00 points awarded if the project will result in travel time savings for trips that end in TAZs with employment that is two standard deviations greater than the regional average (specific thresholds are still under development)

Addresses the Needs of Basic Sector Industries	0-30	Scoring based on the degree to which a project will provide or improve access to basic sector industries within Hampton Roads. Points are awarded according to three subcriteria: • (10.00 points possible) Increases Access for Defense Installations o Up to 10.00 points awarded if a project significantly reduces travel time for trips that end in TAZs with major military bases (specific thresholds are still under development) • (10.00 points possible) Increases Access to Tourist Destinations o Up to 10.00 points awarded if a project significantly reduces travel time for trips that end in TAZs with tourism employment that is more than one standard deviation greater than average tourism employment for the region (specific thresholds are still under development) • (10.00 points possible) Increases Access to Port Facilities o Up to 10.00 points awarded if a project significantly reduces travel time for trips that end in TAZs that provide critical access to a port (specific thresholds are still under development)
Increases Opportunity	0-20	Scoring based on a project's ability to bring in new dollars or businesses. Points are awarded according to two subcriteria: • (10.00 points possible) Provides New or Increased Access o 10.00 points awarded if a project provides new access to an area in a way that would encourage economic development in that area o 5.00 points awarded if a project provides increased access to an area in a way that would encourage economic development in that area o 0.00 points awarded if a project does not provide new or increased access to an area • (10.00 points possible) Supports Plans for Future Growth o 10.00 points awarded if a project is located in an area specifically designated as a growth area in local comprehensive plans. Staff will assess jurisdictional comprehensive plans to determine the relative score. o 5.00 points awarded if a project is supported by a jurisdictional comprehensive plan o 0.00 points awarded if a project is not supported by a jurisdictional comprehensive plan or located in a designated growth area as described above

"**Bicycle and Pedestrian" Projects**

Evaluation Criterion	Points	Scoring Instructions
Project Utility – 100 Points Total		
System Continuity and Connectivity	1-30	Scoring based on its impact to the connectivity and continuity of the greater Hampton Roads network of bicycle and pedestrian facilities. Points are awarded according to four subcriteria: • (4.00 points possible) Regional Significance o 4.00 points awarded if the project is expected to improve connectivity and continuity on a regional level (project would have to be regionally significant with regards to connectivity and continuity and provide considerable benefit to the regional bicycle/pedestrian system) o 2.00 points awarded if the project is expected to improve connectivity and continuity on a multijurisdictional level (provide benefit to at least two local jurisdictions) o 1.00 point awarded if the project is expected to improve connectivity and continuity on a local level (benefit to only one jurisdiction) • (7.00 points possible) Elimination of Barriers or Completion of Gaps across Major Barriers (e.g., crossing of a major arterial or body of water, moving bicycle/pedestrian travel paths away from the roadway, etc.) o 7.00 points awarded if the project will eliminate at least one barrier or complete at least one gap across a major barrier o 0.00 points awarded if the project will **not** eliminate or complete a gap across a major barrier • (8.00 points possible) Connection of Existing Bicycle and Pedestrian Facilities o 8.00 points awarded if the project will connect at least two existing bicycle/pedestrian facilities o 0.00 points awarded if the project will not connect existing bicycle/pedestrian facilities • (11.00 points possible) Project Provides Access to Transit, Local, or Regional Destinations (e.g., schools, employment centers, parks, or high density residential areas) o 11.00 points awarded if the project will provide access to three or more destinations o 7.25 points awarded if the project will provide access to two destinations o 3.75 points awarded if the project will provide access to one destination o 0.00 points awarded if the project will not provide access to any destinations

Safety	0-30	Scoring based on the degree to which a project is expected to improve safety. Points are awarded according to two subcriteria: • (15.00 points possible) Crash History – average number of crashes (involving bicycles or pedestrians) per year during a predetermined three-year period. o 15.00 points awarded if six or more average annual bicycle/pedestrian crashes occurred o 7.50 points awarded if less than six but greater than one average annual bicycle/pedestrian crash occurred o 0.00 points awarded if no bicycle or pedestrian crashes occurred during the three-year period • (15.00 points possible) Project Is Being Completed to Address an Existing Safety Issue or Concern o 15.00 points awarded if the project will address at least one existing safety issue or concern (such as dedicating lanes, removing conflicts, or installing signage) o 0.00 points awarded if the project will not address an existing safety issue or concern
Cost Effectiveness	0-20	Scoring based on the ratio of the overall cost of the project with respect to the number of users the project will serve (calculated as the population residing within a 1.5-mile radius of the project) • 20.00 points awarded if the ratio of the project cost to the projected population served is less than or equal to $25 per person • 0.00 points awarded if the ratio of the project cost to the projected population served is greater than or equal to $100 per person • Projected ratios greater than $25 per person but less than $100 per person are awarded points between 20.00 and 0.00 using straight-line interpolation
Compatibility with Existing Land Use Patterns and Future Plans and Development	0-10	Scoring based on the degree to which a project is compatible with existing land use patterns and future development plans • 10.00 points awarded if the project is compatible with existing land use patterns and future plans and has been formally adopted by a body of elected officials (such as part of a comprehensive plan) • 5.00 points awarded if the project is compatible with existing land use patterns and future plans but has not been formally adopted by a body of elected officials • 0.00 points awarded if the project is not compatible with existing land uses and future development
Enhances Other Categories	0-10	Scoring based on the degree to which a project will enhance other project categories (e.g., bus shelters, HOV service*, water crossing*, TDM initiative or ITS improvement, or intermodal movement) • 10.00 points awarded if the project will improve three or more categories • 6.75 points awarded if the project will improve two categories • 3.50 points awarded if the project will improve one category • 0.00 points awarded if the project will not improve any categories *A project can only receive credit for one highway or bridge/tunnel enhancement even if it enhances both categories

Project Viability – 100 Points Total		
Amount of Additional Local Match or Private Funding Committed to the Project	0-40	Scoring based on the amount (in percentage of total project budget) of additional local match or private funding committed to the project beyond the required match. • 40.00 points awarded if committed funding is greater than or equal to 100% of the project budget • 32.50 points awarded if committed funding is less than 100% but greater than or equal to 80% of the project budget • 25.00 points awarded if committed funding is less than 80% but greater than or equal to 60% of the project budget • 15.00 points awarded if committed funding is less than 60% but greater than or equal to 40% of the project budget • 7.50 points awarded if committed funding is less than 40% but greater than or equal to 20% of the project budget • 0.00 points awarded if committed funding is less than 20% of the project budget
Prior Commitment	0-10	Scoring based on whether a project has prior commitment (i.e., inclusion in the current Long Range Transportation Plan [LRTP]). • 10.00 points awarded if the project is included in the current LRTP • 0.00 points awarded if the project is not included in the current LRTP
Federal Mandates	0-10	Scoring based on whether a project is backed by federal mandates (e.g., emergency bridge replacements, projects addressing significant existing design deficiencies, and projects with soon to expire federal funding previously allocated to the project) • 10.00 points awarded if the project is backed by documented federal mandates • 0.00 points awarded if the project is not backed by documented federal mandates
Degree of Project Readiness	0-40	Scoring based on how quickly a project could begin construction. Points are awarded cumulatively according to three components: • 15.00 points awarded if the design plans are complete and ready for advertisement, plus • 15.00 points awarded if the environmental plans/permits required for the project are complete, plus • 10.00 points awarded if the project is fully funded

"Systems Management/TDM/Operational Improvements" Projects

Evaluation Criterion	Points	Scoring Instructions
Project Utility – 100 Points Total		
Existing Congestion Level	3-30	Scoring based on the level of congestion within the project's impact area (according to the LRTP congestion classification) • 30.00 points awarded if the project area congestion classification is Severe • 15.00 points awarded if the project area congestion classification is Moderate • 3.00 points awarded if the project area congestion classification is Low
Cost Effectiveness	0-15	Scoring based on the ratio of the total travel cost savings to the total cost of the project. • 15.00 points awarded if the ratio of travel cost savings to total project cost is greater than or equal to 3.0 • 0.00 points awarded if the ratio of travel cost savings to total project cost is less than or equal to 0.0 • Ratios of travel cost savings to total project cost less than 3.0 but greater than 0.0 are awarded points between 15.00 and 0.00 using straight-line interpolation
Air Quality	0-15	Scoring based on the total reduction (in tons) of VOC and NOx emissions annually if the project were constructed. • 15.00 points awarded if the total annual VOC and NOx emissions reduction is greater than or equal to 10 tons per year • 0.00 points awarded if the total annual VOC and NOx emissions reduction is less than or equal to 0 tons per year • Annual VOC and NOx emissions reductions less than 10 tons per year but greater than 0 tons per year are awarded points between 15.00 and 0.00 using straight-line interpolation
Safety	0-15	Scoring based on the degree to which a project is expected to improve safety. Points are awarded cumulatively according to three components. • 5.00 points awarded if the project will improve an established and documented evacuation or incident management route, plus • 5.00 points awarded if the project includes the implementation of emergency vehicle preemption or incident detection systems, plus • 5.00 points awarded if the project is expected to reduce the number of crashes annually based on crash data obtained from the past three years (if the project is addressing a known cause of crashes, then it is expected that the project would decrease the number of crashes throughout the study area)

Regional Significance	2-15	Scoring based on the degree to which a project will improve mobility, access, or communications within the region. Points are awarded according to three subcriteria: • (6.00 points possible) Mobility or Accessibility Needs o 6.00 points awarded if the project addresses mobility or accessibility needs on a regional level (project would have to be regionally significant with regards to mobility and accessibility and provide considerable progress in meeting regional needs) o 4.00 points awarded if the project addresses mobility or accessibility needs on a multijurisdictional level (provides benefit to at least two local jurisdictions) o 2.00 points awarded if the project addresses mobility or accessibility needs on a local level (benefit to only one jurisdiction) • (3.00 points possible) Improves Communications between Operating Agencies o 3.00 points awarded if the project will improve communications between at least two operating agencies (e.g., police, fire, VDOT 511, City Traffic Operations Centers, etc.) o 0.00 points awarded if the project will not improve communications between operating agencies • (6.00 points possible) Project Is Part of the Regional ITS Strategic Plan o 6.00 points awarded if the project is officially documented within the Regional ITS Strategic Plan o 0.00 points awarded if the project is not part of the Regional ITS Strategic Plan
Enhances Other Categories	0-10	Scoring based on the degree to which a project will enhance other project categories (e.g., bus shelters, sidewalks or bike paths, HOV service*, water crossing*, or intermodal movement) • 10.00 points awarded if the project will improve three or more categories • 6.75 points awarded if the project will improve two categories • 3.50 points awarded if the project will improve one category • 0.00 points awarded if the project will not improve any categories *A project can only receive credit for one highway or bridge/tunnel enhancement even if it enhances both categories

TDM Specific Criterion **(TDM projects only)**	3.75-25	Scoring based on the degree to which a project will encourage alternate modes of transportation or offer new TDM programs. Points are awarded according to four subcriteria: • (6.25 points possible) Number of New Employers Offering TDM Programs (after project completion) o 6.25 points awarded if the number of new employers offering TDM programs is greater than or equal to 25 o 0.00 points awarded if no new employers offer TDM programs o Numbers of new employers offering TDM programs less than 25 but greater than 0 are awarded points between 6.25 and 0.00 using straight-line interpolation • (6.25 points possible) Resulting Percentage of Employees Ridesharing (if the project is implemented) o 6.25 points awarded if the percentage of employees ridesharing is greater than 10% o 4.00 points awarded if the percentage of employees ridesharing is less than or equal to 10% but greater than or equal to 5% o 2.00 points awarded if the percentage of employees ridesharing is less than 5% • (5.00 points possible) Resulting Percentage of Employees Walking/Biking (if the project is implemented) o 5.00 points awarded if the percentage of employees walking/biking is greater than 5% o 3.50 points awarded if the percentage of employees walking/biking is less than or equal to 5% but greater than or equal to 3% o 1.75 points awarded if the percentage of employees walking/biking is less than 3% • (7.50 points possible) Parking Management (includes strategies such as long- vs. short-term parking, special carpool/hybrid parking, implementation of parking fees, etc.) o 7.50 points awarded if the project includes parking management strategies o 0.00 points awarded if the project does not include parking management strategies

Project Viability – 100 Points Total		
Amount of Additional Local Match or Private Funding Committed to the Project	0-40	Scoring based on the amount (in percentage of total project budget) of additional local match or private funding committed to the project beyond the required match. • 40.00 points awarded if committed funding is greater than or equal to 100% of the project budget • 32.50 points awarded if committed funding is less than 100% but greater than or equal to 80% of the project budget • 25.00 points awarded if committed funding is less than 80% but greater than or equal to 60% of the project budget • 15.00 points awarded if committed funding is less than 60% but greater than or equal to 40% of the project budget • 7.50 points awarded if committed funding is less than 40% but greater than or equal to 20% of the project budget • 0.00 points awarded if committed funding is less than 20% of the project budget
Prior Commitment	0-10	Scoring based on whether a project has prior commitment (i.e., inclusion in an official document). • 10.00 points awarded if the project is included in an official document • 0.00 points awarded if the project is not included in an official document
Federal Mandates	0-10	Scoring based on whether a project is backed by federal mandates (e.g., emergency bridge replacements, projects addressing significant existing design deficiencies, and projects with soon to expire federal funding previously allocated to the project) • 10.00 points awarded if the project is backed by documented federal mandates • 0.00 points awarded if the project is not backed by documented federal mandates
Degree of Project Readiness	0-40	Scoring based on how quickly a project could begin construction. Points are awarded cumulatively according to three components: • 15.00 points awarded if the design plans are complete and ready for advertisement, plus • 15.00 points awarded if the environmental plans/permits required for the project are complete, plus • 10.00 points awarded if the project is fully funded

"Transit" Projects

Evaluation Criterion	Points	Scoring Instructions
Project Utility – 100 Points Total		
Existing Usage or Prospective Ridership	0-20	Scoring based on the existing average daily ridership for an improvement project or the forecasted daily ridership for a new project • 20.00 points awarded if daily ridership is greater than or equal to 12,000 passengers per day • 0.00 points awarded if daily ridership is less than or equal to 100 passengers per day • Projected daily riderships less than 12,000 passengers per day but greater than 100 passengers per day are awarded points between 20.00 and 0.00 using straight-line interpolation
System Continuity and Connectivity	3-20	Scoring based on the degree to which a project will improve continuity and connectivity of transit systems within the region. Points are awarded according to two subcriteria: • (9.00 points possible) Regional Significance o 9.00 points awarded if the project is expected to improve connectivity and continuity on a regional level (would have to be regionally significant with regards to connectivity and continuity and provide considerable benefit to the regional transit system) o 6.00 points awarded if the project is expected to improve connectivity and continuity on a multijurisdictional level (provides benefit to at least two local jurisdictions) o 3.00 points awarded if the project is expected to improve connectivity and continuity on a local level (benefit to only one local jurisdiction) • (11.00 points possible) Improving Transit Access to Freight Distribution Facilities, Ports, Major Industrial Clients, or Employment and Population Centers o 11.00 points awarded if the project improves access on a regional level (must include access to seaport, airport, military facility, inter-jurisdictional connection, or major industrial/employment center) o 5.50 points awarded if the project improves access to these facilities but not on a regional level (such as to a local commerce park) o 0.00 points awarded if the project does not improve access to these facilities

User Benefit	0-15	Scoring based on the degree to which a project will reduce travel times for users and whether the project results in a new amenity. Points are awarded according to two subcriteria: • (10.00 points possible) Annual Travel Time Savings per Rider (after completion of a project) o 10.00 points awarded if the project will result in annual travel time savings greater than or equal to 1.0 hour per rider o 0.00 points awarded if the project will not result in any annual travel time savings per rider o Annual travel time savings less than 1.0 hour per rider but greater than 0 hours per rider are awarded points between 10.00 and 0.00 using straight-line interpolation • (5.00 points possible) New Project – classifies whether the project will result in new transit amenities o 5.00 points awarded if the project results in the creation of new transit amenities (e.g., new service, route, etc.) o 0.00 points awarded if the project is an upgrade to an existing system
Cost Effectiveness	0-15	Scoring based on the ratio of the annual capital and operating costs of the project with respect to the number of users the project will serve (calculated by dividing the sum of the estimated total annualized capital cost of the project and the estimated total annualized operating cost of the project by the estimated annual ridership) • 15.00 points awarded if the annualized cost is less than or equal to $5 per rider • 0.00 points awarded if the annualized cost is greater than or equal to $50 per rider • Projected ratios greater than $5 per rider annually but less than $50 per rider annually are awarded points between 15.00 and 0.00 using straight-line interpolation
Compatibility with Existing Land Use Patterns and Future Plans and Development	0-15	Scoring based on the degree to which a project is compatible with existing land use patterns and future development plans • 15.00 points awarded if the project is compatible with existing land use patterns and future plans and has been formally adopted by a body of elected officials (such as part of a comprehensive plan) • 7.50 points awarded if the project is compatible with existing land use patterns and future plans but has not been formally adopted by a body of elected officials. • 0.00 points awarded if the project is not compatible with existing land uses and future development
Air Quality	0-10	Scoring based on the total reduction (in tons) of VOC and NOx emissions annually if the project were constructed. • 10.00 points awarded if the total annual VOC and NOx emissions reduction is greater than or equal to 200,000 tons per year • 0.00 points awarded if the total annual VOC and NOx emissions reduction is less than or equal to 0 tons per year • Annual VOC and NOx emissions reductions less than 200,000 tons per year but greater than 0 tons per year awarded points between 10.00 and 0.00 using straight-line interpolation

Enhances Other Categories	0-5	Scoring based on the degree to which a project will enhance other project categories (e.g., sidewalks or bike paths, HOV service*, water crossing*, TDM initiative or ITS improvement, or intermodal movement) • 5.00 points awarded if the project will enhance three or more other categories • 3.50 points awarded if the project will enhance two other categories • 1.75 points awarded if the project will enhance one other category • 0.00 points awarded if the project will not enhance any other categories *A project can only receive credit for one highway or bridge/tunnel enhancement even if it enhances both categories
Project Viability – 100 Points Total		
Amount of Additional Local Match or Private Funding Committed to the Project	0-40	Scoring based on the amount (in percentage of total project budget) of additional local match or private funding committed to the project beyond the required match. • 40.00 points awarded if committed funding is greater than or equal to 100% of the project budget • 32.50 points awarded if committed funding is less than 100% but greater than or equal to 80% of the project budget • 25.00 points awarded if committed funding is less than 80% but greater than or equal to 60% of the project budget • 15.00 points awarded if committed funding is less than 60% but greater than or equal to 40% of the project budget • 7.50 points awarded if committed funding is less than 40% but greater than or equal to 20% of the project budget • 0.00 points awarded if committed funding is less than 20% of the project budget
Prior Commitment	0-10	Scoring based on whether a project has prior commitment (i.e., inclusion in the current Long Range Transportation Plan [LRTP]). • 10.00 points awarded if the project is included in the current LRTP • 0.00 points awarded if the project is not included in the current LRTP
Federal Mandates	0-10	Scoring based on whether a project is backed by federal mandates (e.g., emergency bridge replacements, projects addressing significant existing design deficiencies, and projects with soon to expire federal funding previously allocated to the project) • 10.00 points awarded if the project is backed by documented federal mandates • 0.00 points awarded if the project is not backed by documented federal mandates

Degree of Project Readiness	0-40	Scoring based on how quickly a project could begin construction. Points are awarded cumulatively according to two components: • 20.00 points awarded if the project has received Federal Transit Authority (FTA) approval for final design, plus • 20.00 points awarded if the project has received environmental clearance
Economic Vitality – 100 Points Total		
Labor Market Access	0-45	Scoring based on the degree to which a project will reduce the effective distance that workers have to travel to get to work. Points are awarded according to four subcriteria: • (20.00 points possible) Increases Access for Major Employment Centers o Up to 20.00 points awarded if employment along the transit line is greater than one standard deviation above the regional mean (specific thresholds are still under development) • (10.00 points possible) Increases Travel Time Reliability o Up to 10.00 points awarded based on level of service, number of incidents, and staff analysis of a project's ability to enhance travel time reliability (specific thresholds are still under development) • (10.00 points possible) Increases Frequency of Service o Up to 10.00 points awarded if service frequency is high (specific thresholds are still under development) • (5.00 points possible) Provides Access to Institutions of Higher Education o 5.00 points awarded if the project has either a two or four year academic institution within ½ mile of its route o 0.00 points awarded if the project does not have an institution of higher education with ½ mile of its route
Addresses the Needs of Basic Sector Industries	0-20	Scoring based on the degree to which a project will provide or improve access to basic sector industries within Hampton Roads. Points are awarded according to two subcriteria: • (10.00 points possible) Provides or Improves Access for Defense Installations o 10.00 points awarded if a transit project passes within ¼ mile of a major defense installation o 5.00 points awarded if a transit project passes within ½ mile of a major defense installation o 0.00 points awarded if the project does not pass within ½ mile of a major defense installation • (10.00 points possible) Increases Access to Tourist Destinations o 10.00 points awarded if a transit project has a high density tourism employment of 15,000 within ¼ mile of its line o 5.00 points awarded if a transit project has a high density tourism employment of 7,500 within ½ mile of its line o 0.00 points awarded if the project has less than 7,500 high density tourism employment within ½ mile of its line

Increases Opportunity	0-20	Scoring based on a project's ability to bring in new dollars or businesses. Points are awarded according to two subcriteria: • (5.00 points possible) Provides New Access to the Network o Up to 5.00 points awarded based on staff assessment of the project (specific thresholds are still under development) • (15.00 points possible) Supported by Plans for Increased Density and Economic Activity o 15.00 points awarded if a project is located within a strategic growth area (such as enterprise zones, empowerment zones, and technology zones) o Up to 10.00 points awarded if a project is located in an area that has plans for increased density. Staff will assess jurisdictional comprehensive plans to determine the relative score.
Economic Distress Factors	0-15	Scoring based on a project's level of access provided to economically disadvantaged areas. Points are awarded according to two subcriteria: • (5.00 points possible) Provides Access to Areas with High Unemployment o 5.00 points awarded if any TAZ along the project's transit route has an unemployment rate greater than two standard deviations above the regional average o 0.00 points awarded if no TAZ along the project's transit route has an unemployment rate greater than two standard deviations above the regional average • (10.00 points possible) Provides Access to Low Income Areas o 10.00 points awarded if any TAZ located within ¼ mile of the transit line has a median income that is less than twice the poverty level o 5.00 points awarded if any TAZ located within ½ mile of the transit line has a median income that is less than twice the poverty level o 0.00 points awarded if no TAZ within ½ mile of the transit has a median income that is less than twice the poverty level

“Intermodal” Projects

Evaluation Criterion	Points	Scoring Instructions
Project Utility – 100 Points Total		
Better Accommodates Intermodal Movements	10-30	Scoring based on the level at which a project will improve the efficiency of intermodal movements • 30.00 points awarded if the project will provide conflict free intermodal movements (e.g., grade-separated rail crossing) • 20.00 points awarded if the project will provide limited conflict intermodal movements (e.g., at-grade rail crossing of a facility with low ADT) • 10.00 points awarded if the project will provide conflicting intermodal movements (e.g., at-grade rail crossing of a busy arterial with high ADT)
Improving Vehicular Access to Freight Distribution Facilities, Ports, Major Industrial Clients, or Employment and Population Centers	0-30	Scoring based on the extent to which a project will improve existing access to freight distribution facilities, ports, etc. • 30.00 points awarded if the project improves access on a regional level (must improve access to at least one of the following: seaport, airport, military facility, connections between jurisdictions, or connections between major industrial/employment centers) • 15.00 points awarded if the project improves access to these facilities but not on a regional level • 0.00 points awarded if the project does not improve access to these facilities
Cost Effectiveness	0-25	Scoring based on the ratio of revenue increase to overall cost of the project • 25.00 points awarded if the ratio of revenue increase to project cost is greater than or equal to 1.5 • 0.00 points awarded if the ratio of revenue increase to project cost is less than or equal to 0.9 • Projected ratios less than 1.5 but greater than 0.9 are awarded points between 25.00 and 0.00 using straight-line interpolation
Enhances Other Categories	0-15	Scoring based on the degree to which a project will enhance other project categories (e.g., bus shelters, sidewalks or bike paths, HOV service*, water crossing*, or TDM initiative or ITS improvement) • 15.00 points awarded if the project will enhance three or more other categories • 10.00 points awarded if the project will enhance two other categories • 5.00 points awarded if the project will enhance one other category • 0.00 points awarded if the project will not enhance any other categories *A project can only receive credit for one highway or bridge/tunnel enhancement even if it enhances both categories

Project Viability – 100 Points Total		
Amount of Additional Local Match or Private Funding Committed to the Project	0-40	Scoring based on the amount (in percentage of total project budget) of additional local match or private funding committed to the project beyond the required match. • 40.00 points awarded if committed funding is greater than or equal to 100% of the project budget • 32.50 points awarded if committed funding is less than 100% but greater than or equal to 80% of the project budget • 25.00 points awarded if committed funding is less than 80% but greater than or equal to 60% of the project budget • 15.00 points awarded if committed funding is less than 60% but greater than or equal to 40% of the project budget • 7.50 points awarded if committed funding is less than 40% but greater than or equal to 20% of the project budget • 0.00 points awarded if committed funding is less than 20% of the project budget
Prior Commitment	0-10	Scoring based on whether a project has prior commitment (i.e., inclusion in the current Long Range Transportation Plan [LRTP]). • 10.00 points awarded if the project is included in the current LRTP • 0.00 points awarded if the project is not included in the current LRTP
Federal Mandates	0-10	Scoring based on whether a project is backed by federal mandates (e.g., emergency bridge replacements, projects addressing significant existing design deficiencies, and projects with soon to expire federal funding previously allocated to the project) • 10.00 points awarded if the project is backed by documented federal mandates • 0.00 points awarded if the project is not backed by documented federal mandates
Degree of Project Readiness	0-40	Scoring based on how quickly a project could begin construction. Points are awarded cumulatively according to three components: • 15.00 points awarded if the design plans are complete and ready for advertisement, plus • 15.00 points awarded if the environmental plans/permits required for the project are complete, plus • 10.00 points awarded if the project is fully funded

Economic Vitality – 100 Points Total		
Total Reduction in Travel Time	0-20	Scoring based on a project's ability to decrease travel time for the entire region, as determined using HRTPO's travel demand model • Up to 20.00 points awarded based on a project's success in meeting this measure (specific thresholds are still under development)
Labor Market Access	0-20	Scoring based on the degree to which a project will reduce the effective distance that workers have to travel to get to work. Points are awarded according to two subcriteria: • (15.00 points possible) Increases Travel Time Reliability o Up to 15.00 points awarded based on level of service, number of incidents, and staff analysis of a project's ability to enhance travel time reliability (specific thresholds are still under development) • (5.00 points possible) Increases Access for Major Employment Centers o Up to 5.00 points awarded if the project will result in travel time savings for trips that end in TAZs with employment that is two standard deviations greater than the regional average (specific thresholds are still under development)
Impact on Truck Movement	0-15	Scoring based on a project's impact to truck movement as determined using freight volumes, crash data, and capacity estimates • 15.00 points awarded if a project impacts greater than 3,000 trucks per day • 10.00 points awarded if a project impacts greater than 1,500 but less than or equal to 3,000 trucks per day • 5.00 points awarded if a project impacts less than or equal to 1,500 trucks per day
Improves Interaction between Modes of Travel	0-15	Scoring based on a project's ability to improve interaction between other modes of travel. Points are awarded cumulatively according to three components: • 5.00 points awarded if a project increases access to the Port • 5.00 points awarded if a project improves freight movement by rail • 5.00 points awarded if a project increases access to airports

Increases Opportunity	0-30	Scoring based on a project's ability to bring in new dollars or businesses. Points are awarded according to two subcriteria: • (20.00 points possible) Provides New or Increased Access o 20.00 points awarded if a project opens a new access to an area that is primed for development, but was previously inaccessible o 10.00 points awarded if a project allows increased or expanded access to an existing area o 0.00 points awarded if a project does not provide new, increased, or expanded access as described above • (10.00 points possible) Supports Plans for Future Growth o 10.00 points awarded if a project is located in an area specifically designated as a growth area in local comprehensive plans. Staff will assess jurisdictional comprehensive plans to determine the relative score. o 5.00 points awarded if a project is supported by a jurisdictional comprehensive plan o 0.00 points awarded if a project is not supported by a jurisdictional comprehensive plan or located in a designated growth area as described above

Appendix G1

Program Prioritization Tool
Structure and Data Inputs

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Appendix G1 – Program Prioritization Tool Structure and Data Inputs

G1.1 General Overview/Structure of the Tool

The general layout of the tool (as illustrated with the "Highways" project category input tab) is illustrated in **Figure 1**. This figure and other screen shots from the tool are used throughout this chapter to help demonstrate the structure of the tool. These figures are intended only to illustrate general key elements of the tool, and therefore the clarity of these graphics is not illustrative of detailed line items or inputs. Additionally, some columns in the screen shots may be labeled as "CELLS LOCKED." The locked cells indicate that these columns are referenced through the macros and should not be changed, even if the project categories, evaluation criteria, weighting factors, or MOEs are revised. However, in the actual tool, there are no passwords or security in place to prevent the user from observing these columns.

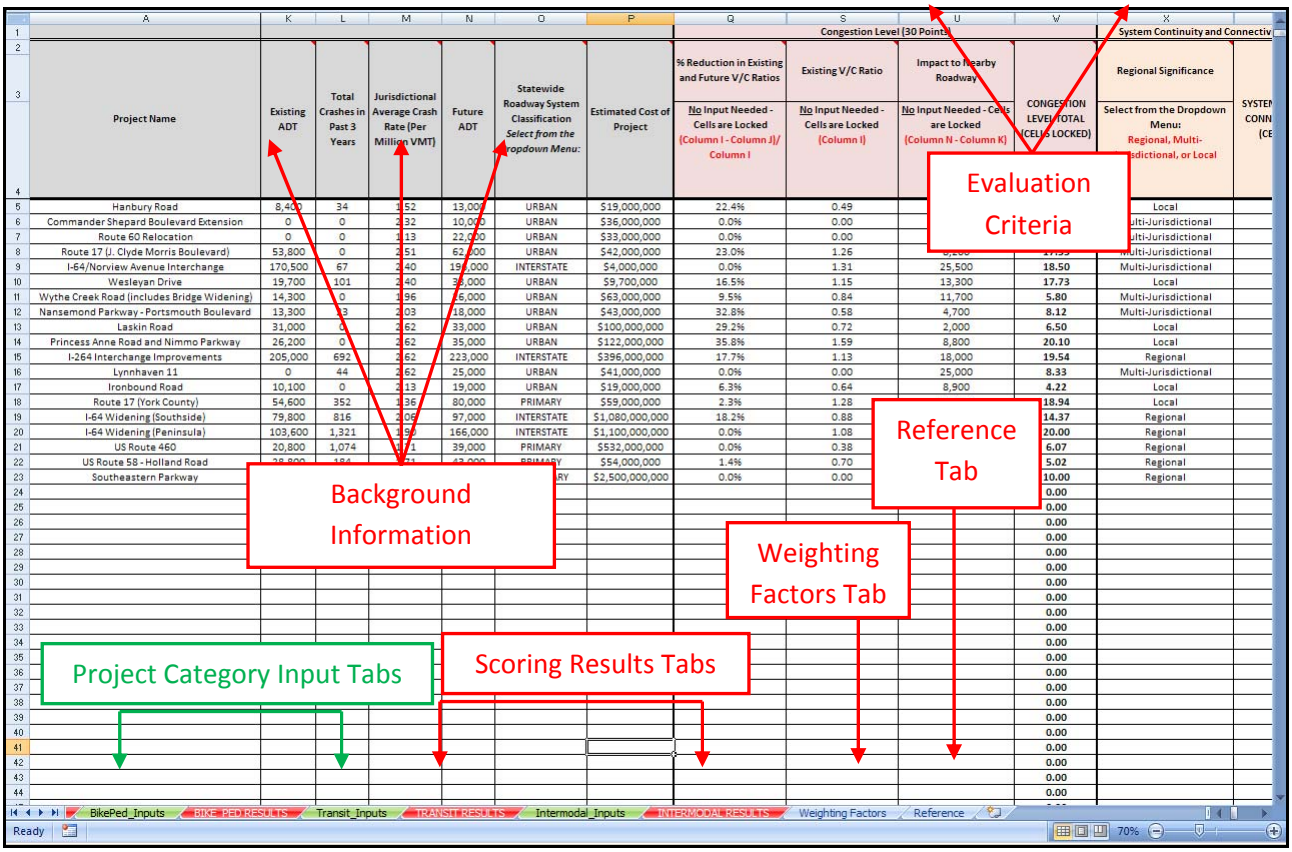


Figure 1 - Program Prioritization Tool General Layout

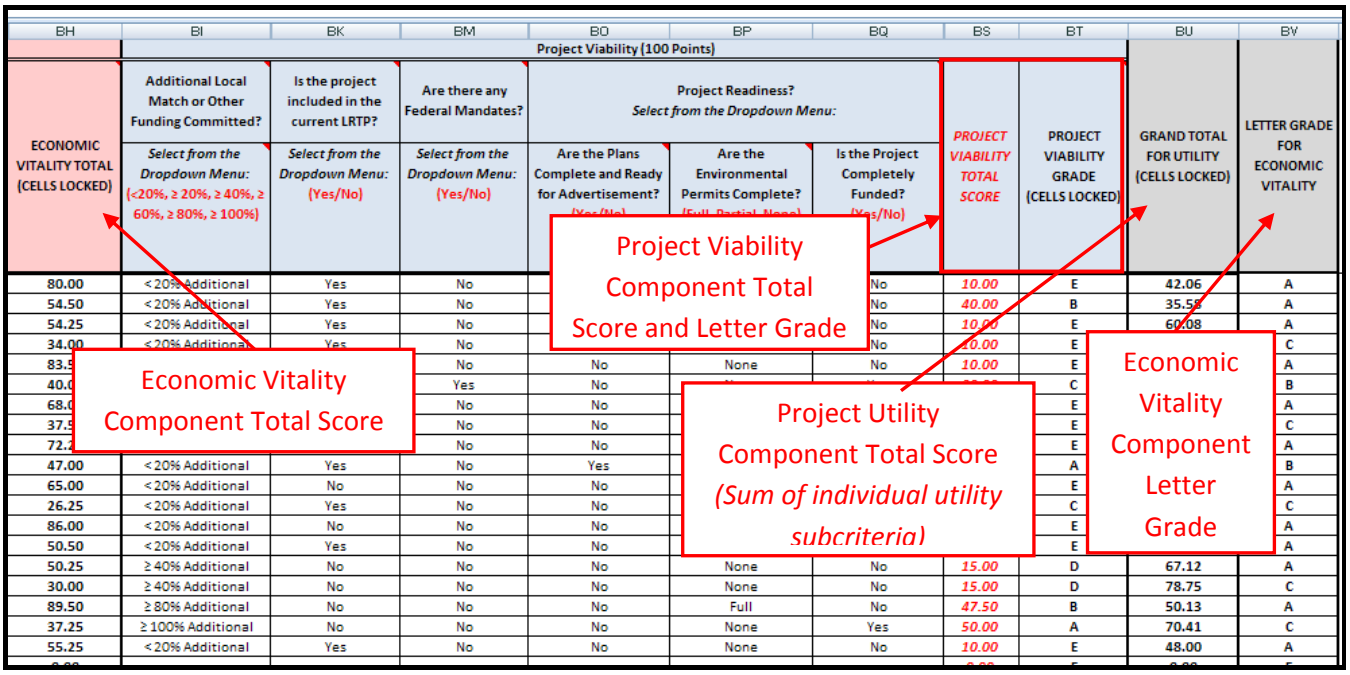
Under each project category input tab (depicted in green), evaluation criteria and background information are included as user inputs. Detailed background inputs are explained later in this chapter, while the various evaluation criteria inputs are described in Chapter 6 of the report. This Appendix is intended to illustrate how and where input data are entered into the tool. The background information (grey headings) and evaluation criteria elements (colors other than grey) also are illustrated in **Figure 1**. As the background information and evaluation criteria are filled in, the tool begins to calculate individual scores for each evaluation criterion.

With a three-part methodology, individual scores for project utility, project viability, and economic vitality are tabulated separately. Each of these traits is evaluated using a 100-point, cumulative scale; however, as mentioned in Chapter 5, the totals are independent of each other and are not added together. They are separate pieces of information on which policy makers can base their decisions. Based on the sampling of projects chosen for the tool validation analysis, letter grades ranging from A (higher score) to E (lower score) were then assigned to the project viability component scores. These letter grade thresholds are illustrated in **Table 1**. Although the economic vitality component was not evaluated during the tool validation analysis, letter grade thresholds similar to those used for the project viability component were assumed. The tool allows for each component's letter grade thresholds to be modified independently as needed.

SCORE RANGE	GRADE
> 50	A
40 - 49	B
25 - 39	C
15 - 24	D
< 15	E

Table 1 - Project Viability and Economic Vitality Component Score/Letter Grade Thresholds

Examples of overall project and individual evaluation criterion scores are illustrated in **Figure 2**. The use of a letter grade system for both the project viability and economic vitality components provides policy makers with a parallel analysis by which they can evaluate how viable projects with high utility scores actually are and how they may influence the economic vitality of the region. A project having a letter grade of A or B is extremely viable and supports economic vitality, while a project having a grade of E may be non-viable or may not influence the economic vitality of the region. A project viability letter grade of E indicates that the project is lacking additional matching funds, plans or permits have not been brought forward, or the project is not ready for construction.


Project Viability Component Total Score and Letter Grade
Economic Vitality Component Total Score
Project Utility Component Total Score (Sum of individual utility subcriteria)
Economic Vitality Component Letter Grade

BH	BI	BK	BM	BO	BP	BQ	BS	BT	BU	BV
	Project Viability (100 Points)									
ECONOMIC VITALITY TOTAL (CELLS LOCKED)	Additional Local Match or Other Funding Committed? *Select from the Dropdown Menu:* (<20%, ≥ 20%, ≥ 40%, ≥ 60%, ≥ 80%, ≥ 100%)	Is the project included in the current LRTP? *Select from the Dropdown Menu:* (Yes/No)	Are there any Federal Mandates? *Select from the Dropdown Menu:* (Yes/No)	Project Readiness? *Select from the Dropdown Menu:* Are the Plans Complete and Ready for Advertisement?	Are the Environmental Permits Complete?	Is the Project Completely Funded?	PROJECT VIABILITY TOTAL SCORE	PROJECT VIABILITY GRADE (CELLS LOCKED)	GRAND TOTAL FOR UTILITY (CELLS LOCKED)	LETTER GRADE FOR ECONOMIC VITALITY
80.00	< 20% Additional	Yes	No			No	10.00	E	42.06	A
54.50	< 20% Additional	Yes	No			No	40.00	B	35.58	A
54.25	< 20% Additional	Yes	No			No	10.00	E	60.08	A
34.00	< 20% Additional	Yes	No			No	10.00	E		C
83.5			No	No	None	No	10.00	E		A
40.0			Yes	No				C		B
68.0			No	No				E		A
37.5			No	No				E		C
72.2			No	No				E		A
47.00	< 20% Additional	Yes	No	Yes				A		B
65.00	< 20% Additional	No	No	No				E		A
26.25	< 20% Additional	Yes	No	No				C		C
86.00	< 20% Additional	No	No	No				E		A
50.50	< 20% Additional	Yes	No	No				E		A
50.25	≥ 40% Additional	No	No	No	None	No	15.00	D	67.12	A
30.00	≥ 40% Additional	No	No	No	None	No	15.00	D	78.75	C
89.50	≥ 80% Additional	No	No	No	Full	No	47.50	B	50.13	A
37.25	≥ 100% Additional	No	No	No	None	Yes	50.00	A	70.41	C
55.25	< 20% Additional	Yes	No	No	None	No	10.00	E	48.00	A

Figure 2 - Total Component Scores and Letter Grades

The weighting factors tab allows the user to view and/or modify existing project weighting factors for all evaluation criteria and subcriteria based on the total possible points available within each category (100 points each for project utility, project viability, and economic vitality). Within this tab, the user also may adjust thresholds for all objective MOEs which involve linear interpolation or letter grade thresholds for the project viability and economic vitality components. Based on the projects being evaluated, individual thresholds for both MOEs and letter grades will need to be adjusted periodically so that points are effectively being awarded amongst all proposed projects within a category. In addition, the weighting factors tab provides a quality control check for each project criterion and subcriterion to ensure that all weighting factors do not exceed the total possible points overall or for that criterion or subcriterion. **Figure 3** illustrates the features provided within the weighting factors tab. All revisions to this tab should only be made based on consensus from a technical committee meeting.

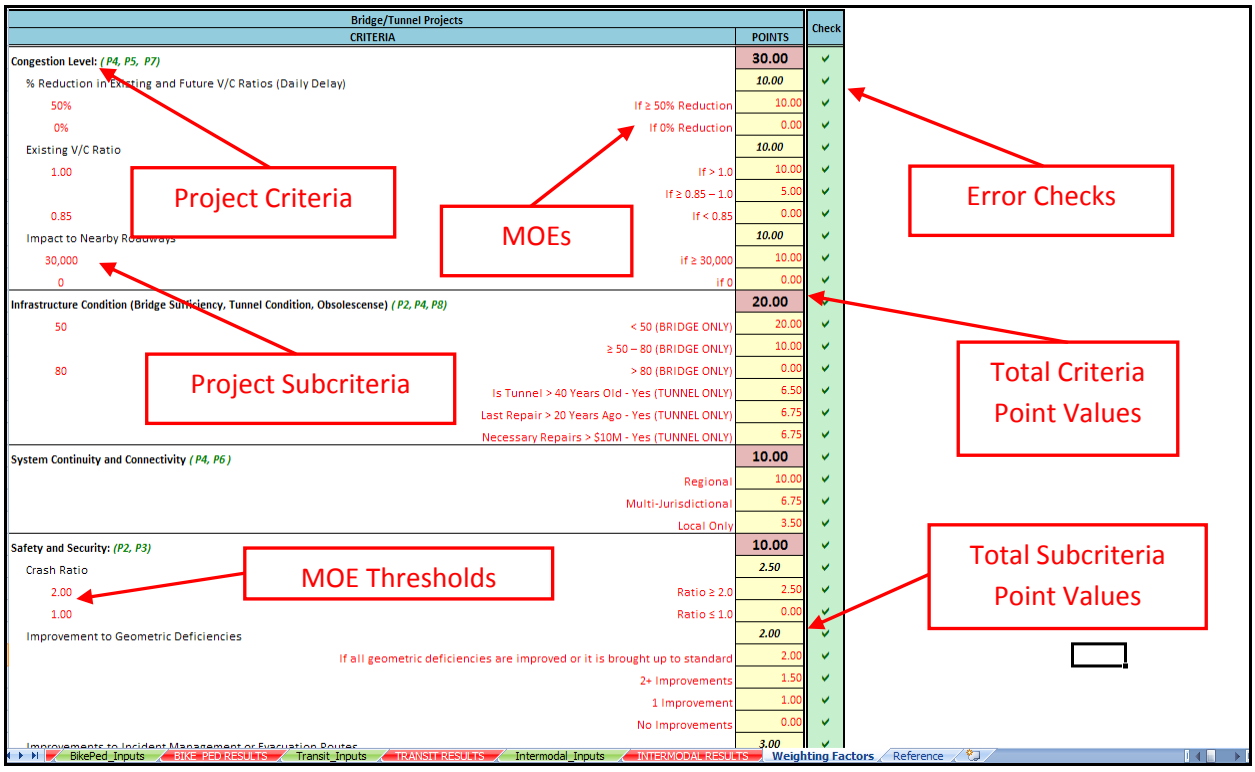


Figure 3 - Elements of the Weighting Factors Tab

Appropriate cell notes are provided for each of the background information and subcriteria input headers. Drop-down selection menus listing the available response choices also are provided to the user. An example of a typical drop-down menu provided in the tool is illustrated in **Figure 4**. All drop-down menus can be edited through the "Reference" tab.

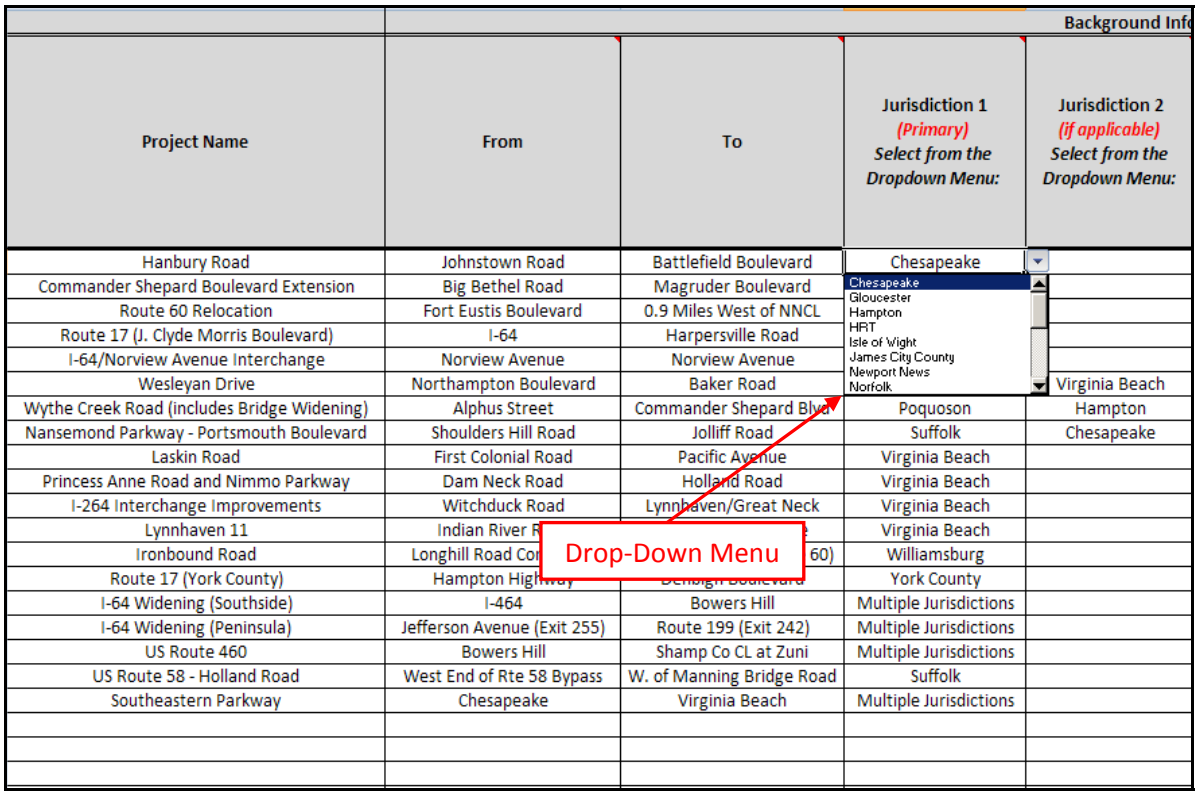
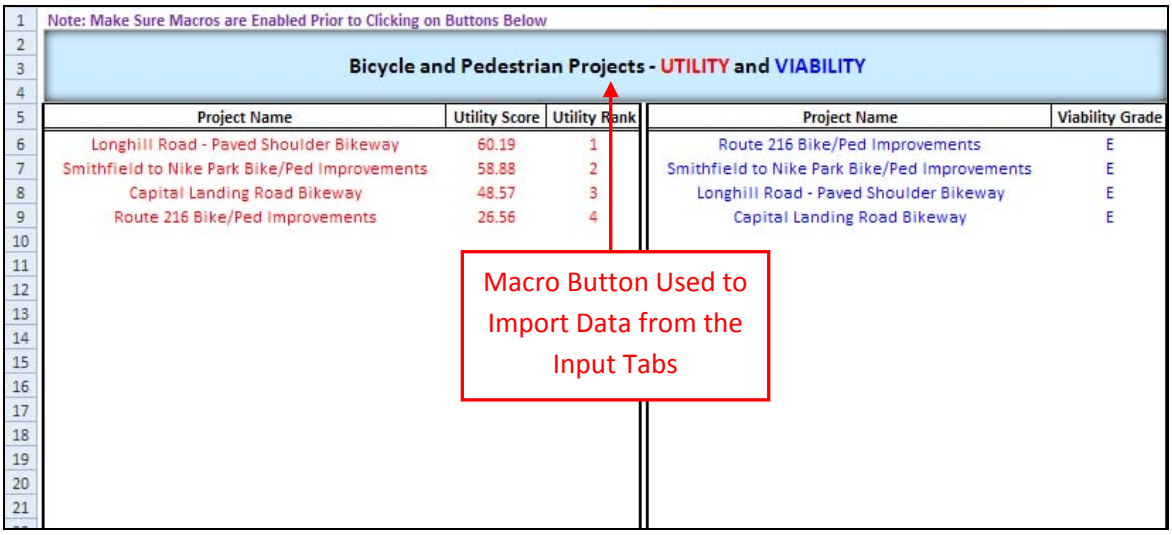


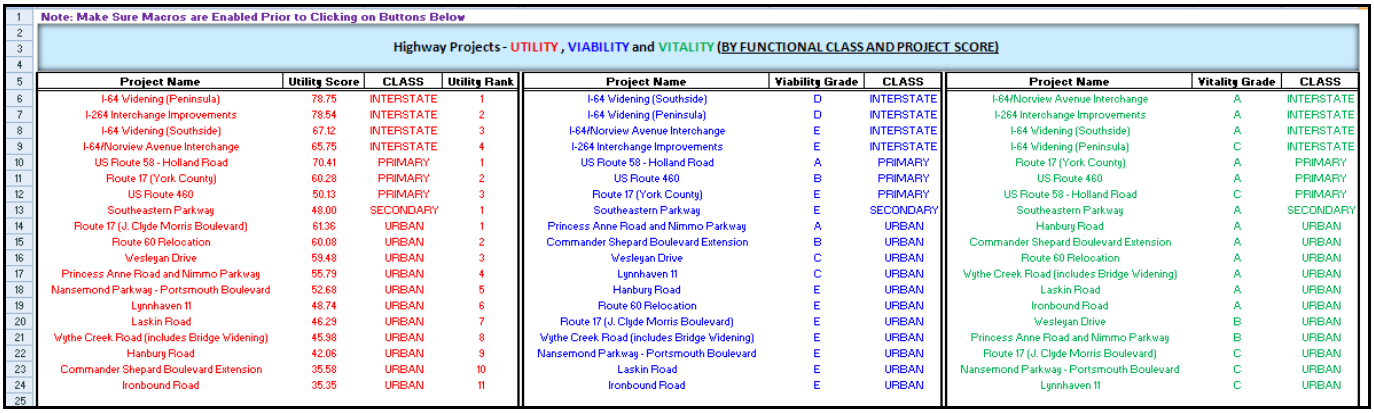
Figure 4 - Drop-Down Menu Example

Project scores are depicted in the various results tabs. Overall, there are ten results tabs (an overall results tab for each category plus two additional tabs ranking scores by VDOT roadway system and by individual criteria for each of the "Highways" and "Bridge/Tunnel" categories). All six of the overall results tabs include a column for the project name, utility score, utility score rank, and viability letter grade while four of the six overall results tabs include an additional letter grade for the economic vitality component. The two categories without an economic vitality component ("Bicycle and Pedestrian" and "Systems Management/Transportation Demand Management/Operational Improvements") have results tabs which resemble a format illustrated in **Figure 5** while the remaining categories have results tabs that resemble a format illustrated in **Figure 6**. To generate the overall ranked project scores and letter grades, users need to click a "button" with the tab name included (shown in light blue in **Figures 5** and **6**) to activate the macros. The macros will then efficiently import and sort all project utility numeric scores, project viability letter grades, and economic vitality letter grades from the respective project category tabs in descending order. This allows the user to quickly compare and evaluate project scores under each primary category. For the "Highways" and "Bridge/Tunnel" categories, an additional overall results tab is included which ranks the projects within each category of the VDOT roadway system (Interstate, Primary, Secondary, Urban, or Other). ***It is highly recommended that the user enable macros within the Excel file before clicking the button.***


Note: Make Sure Macros are Enabled Prior to Clicking on Buttons Below
Bicycle and Pedestrian Projects - UTILITY and VIABILITY
Project Name
Utility Score
Utility Rank
Longhill Road - Paved Shoulder Bikeway 60.19 1
Smithfield to Nike Park Bike/Ped Improvements 58.88 2
Capital Landing Road Bikeway 48.57 3
Route 216 Bike/Ped Improvements 26.56 4
Project Name
Viability Grade
Route 216 Bike/Ped Improvements E
Smithfield to Nike Park Bike/Ped Improvements E
Longhill Road - Paved Shoulder Bikeway E
Capital Landing Road Bikeway E
Macro Button Used to Import Data from the Input Tabs

* Note: Results depicted in screenshot are for illustrative purposes only and may not be representative of actual data

Figure 5 - Overall Result Tab Structure/Layout (for Categories without Economic Vitality Component)


Note: Make Sure Macros are Enabled Prior to Clicking on Buttons Below
Highway Projects - UTILITY , VIABILITY and VITALITY (BY FUNCTIONAL CLASS AND PROJECT SCORE)
Project Name Utility Score CLASS Utility Rank
I-64 Widening (Peninsula) 78.75 INTERSTATE 1
I-264 Interchange Improvements 78.54 INTERSTATE 2
I-64 Widening (Southside) 67.12 INTERSTATE 3
I-64/Norview Avenue Interchange 65.75 INTERSTATE 4
US Route 58 - Holland Road 70.41 PRIMARY 1
Route 17 (York County) 60.28 PRIMARY 2
US Route 460 50.13 PRIMARY 3
Southeastern Parkway 48.00 SECONDARY 1
Route 17 (J. Clyde Morris Boulevard) 61.36 URBAN 1
Route 60 Relocation 60.08 URBAN 2
Wesleyan Drive 59.48 URBAN 3
Princess Anne Road and Nimmo Parkway 55.79 URBAN 4
Nansemond Parkway - Portsmouth Boulevard 52.68 URBAN 5
Lynnhaven 11 48.74 URBAN 6
Laskin Road 46.29 URBAN 7
Wythe Creek Road (includes Bridge Widening) 45.98 URBAN 8
Hanbury Road 42.06 URBAN 9
Commander Shepard Boulevard Extension 35.58 URBAN 10
Ironbound Road 35.35 URBAN 11
Project Name Viability Grade CLASS
I-64 Widening (Southside) D INTERSTATE
I-64 Widening (Peninsula) D INTERSTATE
I-64/Norview Avenue Interchange E INTERSTATE
I-264 Interchange Improvements E INTERSTATE
US Route 58 - Holland Road A PRIMARY
US Route 460 B PRIMARY
Route 17 (York County) E PRIMARY
Southeastern Parkway E SECONDARY
Princess Anne Road and Nimmo Parkway A URBAN
Commander Shepard Boulevard Extension B URBAN
Wesleyan Drive C URBAN
Lynnhaven 11 C URBAN
Hanbury Road E URBAN
Route 60 Relocation E URBAN
Route 17 (J. Clyde Morris Boulevard) E URBAN
Wythe Creek Road (includes Bridge Widening) E URBAN
Nansemond Parkway - Portsmouth Boulevard E URBAN
Laskin Road E URBAN
Ironbound Road E URBAN
Project Name Vitality Grade CLASS
I-64/Norview Avenue Interchange A INTERSTATE
I-264 Interchange Improvements A INTERSTATE
I-64 Widening (Southside) A INTERSTATE
I-64 Widening (Peninsula) C INTERSTATE
Route 17 (York County) A PRIMARY
US Route 460 A PRIMARY
US Route 58 - Holland Road C PRIMARY
Southeastern Parkway A SECONDARY
Hanbury Road A URBAN
Commander Shepard Boulevard Extension A URBAN
Route 60 Relocation A URBAN
Wythe Creek Road (includes Bridge Widening) A URBAN
Laskin Road A URBAN
Ironbound Road A URBAN
Wesleyan Drive B URBAN
Princess Anne Road and Nimmo Parkway B URBAN
Route 17 (J. Clyde Morris Boulevard) C URBAN
Nansemond Parkway - Portsmouth Boulevard C URBAN
Lynnhaven 11 C URBAN

* Note: Results depicted in screenshot are for illustrative purposes only and may not be representative of actual data

Figure 6 - Overall Result Tab Structure/Layout (for Categories with Economic Vitality Component)

The remaining two tabs yet to be described are detailed "Highways" and "Bridge/Tunnel" results by individual evaluation criteria. In each of these tabs is a set of additional buttons, one for each evaluation criterion in "Highways" and "Bridge/Tunnel," which import and sort all projects within the respective category by the numeric score received. This allows the user to view how a project ranked within a specific criterion, which is very useful when evaluating MOE thresholds. For example, a project may score high in *Congestion Level* but have minimal benefits relative to *System Continuity and Connectivity* or *Cost Effectiveness*. This level of detail provides users guidance into how they can improve their overall utility scores to increase the likelihood of receiving federal funding. **Figures 7 and 8** illustrate examples of the "Highways" detailed results and the "Bridge/Tunnel" detailed results, respectively. Full detailed results for the "Highways" and "Bridge/Tunnel" categories sorted by individual criteria are provided in **Appendix G2**.

Note: Make Sure Macros are Enabled Prior to Clicking on Buttons Below

Highways - Congestion Level

Project Name	Score	Rank
Princess Anne Road and Nimmo Parkway	15.10	1
I-64 Widening (Peninsula)	15.00	2
I-264 Interchange Improvements	14.54	3
Route 17 (York County)	13.94	4
I-64/Norview Avenue Interchange	13.50	5
Wesleyan Drive	12.73	6
Route 17 (J. Clyde Morris Boulevard)	12.33	7
I-64 Widening (Southside)	11.87	8
Southeastern Parkway	10.00	9
Lynnhaven 11	8.33	10
Nansemond Parkway - Portsmouth Boulevard	8.12	11
Route 60 Relocation	7.33	12
Laskin Road	6.50	13
US Route 460	6.07	14
Hanbury Road	6.02	15
Wythe Creek Road (includes Bridge Widening)	5.80	16
US Route 58 - Holland Road	5.02	17
Ironbound Road	4.22	18
Commander Shepard Boulevard Extension	3.33	19

Highways - System Continuity and Connectivity

Project Name	Score	Rank
I-264 Interchange Improvements	20.00	1
I-64 Widening (Southside)	20.00	1
I-64 Widening (Peninsula)	20.00	1
US Route 460	20.00	1
US Route 58 - Holland Road	20.00	1
Southeastern Parkway	20.00	1
Commander Shepard Boulevard Extension	13.25	7
Route 60 Relocation	13.25	7
Route 17 (J. Clyde Morris Boulevard)	13.25	7
I-64/Norview Avenue Interchange	13.25	7
Wythe Creek Road (includes Bridge Widening)	13.25	7
Nansemond Parkway - Portsmouth Boulevard	13.25	7
Lynnhaven 11	13.25	7
Hanbury Road	6.75	14
Wesleyan Drive	6.75	14
Laskin Road	6.75	14
Princess Anne Road and Nimmo Parkway	6.75	14
Ironbound Road	6.75	14
Route 17 (York County)	6.75	14

* Note: Results depicted in screenshot are for illustrative purposes only and may not be representative of actual data

Figure 7 - Detailed "Highways" Results Example

Note: Make Sure Macros are Enabled Prior to Clicking on Buttons Below

Bridge/Tunnel - Congestion Level

Project Name	Score	Rank
Hampton Roads Bridge Tunnel	21.39	1
Dominion Boulevard	21.23	2
Midtown Tunnel, MLK Extension	17.20	3
Hampton Roads Third Crossing (I-664 widening)	10.00	4
Hampton Roads Third Crossing (E-W connection)	10.00	4
James River Bridge Improvements	7.50	6
Lesner Bridge	5.03	7
Blackwater Bridge Replacement	0.33	8

Bridge/Tunnel - System Continuity and Connectivity

Project Name	Score	Rank
Hampton Roads Bridge Tunnel	10.00	1
Midtown Tunnel, MLK Extension	10.00	1
Hampton Roads Third Crossing (I-664 widening)	10.00	1
Hampton Roads Third Crossing (E-W connection)	10.00	1
James River Bridge Improvements	6.75	5
Dominion Boulevard	6.75	5
Lesner Bridge	6.75	5
Blackwater Bridge Replacement	3.50	8

* Note: Results depicted in screenshot are for illustrative purposes only and may not be representative of actual data

Figure 8 - Detailed "Bridge/Tunnel" Results Example

G1.2 Data Inputs

Data inputs in the tool are categorized as either background information or evaluation criteria information. Each primary project category contains different input information based on the types of projects considered. The various evaluation criteria for each category are explained in the MOEs chapter of the report (Chapter 6). The following illustrates the specific background project data inputs required for each project category with a detailed description of each. In each of the criteria, labels are placed describing the type of input. ***Manual inputs*** are numeric or text entries needing to be entered into the tool, ***dropdown inputs*** are inputs (located in the reference tab) that the user will select from an established dropdown menu, and ***reference inputs*** are values which are calculated based on other values (either manual, dropdown, or both in nature). Individual project application forms were developed such

that each municipality or agency will be responsible for providing a portion of the objective inputs while all subjective inputs will be entered by a neutral party.

G1.2.1 "Highways" Project Background Inputs

- **Project Name***:* The "Highways" project name *(manual input)*.

- **From** and **To:** The geographical reference point of where the project begins and ends. Examples of geographical reference points include intersecting roadway, milepost, physical boundary, or political boundary *(manual input)*.

- **Jurisdiction 1***:* Indicates the primary jurisdiction where the project will be located *(dropdown input)*. Select the appropriate jurisdiction from the drop-down menu for the following scenarios:
    - Project is located in one jurisdiction – Choose the appropriate jurisdiction from the drop-down menu.
    - Project is located in two jurisdictions – Choose the primary jurisdiction under **Jurisdiction 1** column and the secondary jurisdiction under the **Jurisdiction 2** column.
    - Project is located in more than two jurisdictions – Choose Multiple Jurisdictions from the drop-down menu.

- **Jurisdiction 2***:* Indicates the secondary jurisdiction where the project will be located using the drop-down menu. Only select an input for a project that is located within two jurisdictions. If the project is located in only one jurisdiction or more than two jurisdictions, no input is required under **Jurisdiction 2** *(dropdown input).*

- **Improvement Description***:* A short description of the type of work proposed with the project *(manual input)*. Examples for input include:
    - Roadway Widening – Indicate the number of existing and proposed lanes
    - New Alignment – Indicate the proposed laneage
    - Ramp Improvements
    - Interchange Improvements

- **Length***:* Total length of the project in miles. The distance entered should be the distance between the geographical reference points listed in the **From** and **To** data columns *(manual input)*.

- **Existing ADT***:* Existing ADT volumes are the current year average 24-hour, bidirectional volumes throughout the project limits. If the roadway segments for a project area do not currently exist, manually enter zero for this input *(manual input)*.

- **Future ADT:** Future ADT volumes are the forecasted future year (currently 2030) average bidirectional, 24-hour volumes throughout the project limits *(manual input)*.

- **Existing V/C Ratio***:* The ratio of existing ADT volumes to the average existing daily capacity of the roadway segments throughout the study area. V/C ratios less than 1.0 indicate a roadway segment operating under capacity. V/C ratios greater than 1.0 indicate a roadway segment operating over capacity. If the roadway segment does not currently exist, manually enter 0.00 for this input *(manual input)*.

- **Forecasted V/C Ratio***:* The ratio of future ADT volumes to the average future daily capacity of the roadway segments throughout the study area. V/C ratios less than 1.0 indicate a roadway segment operating under capacity. V/C ratios greater than 1.0 indicate a roadway segment operating over capacity *(manual input)*.

- **Future Daily VMT***:* Average 24-hour volume in each direction throughout the project limits in Year 2030 **(Future ADT)** multiplied by the **Length** of the roadway segment *(reference input)*.

- **Total Crashes in Past Three Years***:* Total number of crashes occurring within the project limits, in each direction, during the past three years. Crash data may be obtained from VDOT, the DMV, or local jurisdictions. It is recommended that entire years of data be used for input. Therefore, if the current date is June 15, 2009, then use the total number of crashes which occurred within the project limits from January 1, 2006 through December 31, 2008. If the roadway segment does not currently exist, manually enter a zero *(manual input)*.

- **Jurisdictional Average Crash Rate (Per Million VMT)***:* Jurisdictional average crash rate per million vehicle miles traveled for all roadway segments within the project area. If the project is proposed under multiple jurisdictions, average the crash rates from each jurisdiction. The jurisdictional average crash rate per million vehicle miles traveled may be obtained from the HRTPO, VDOT, or the local jurisdiction *(manual input)*.

- **Roadway System Classification***:* Existing roadway system classification, as per VDOT, of the roadway segments included within the project area selected from a drop-down menu. Roadway system classification types provided in the drop-down menu include **Interstate, Primary, Secondary, Urban,** and **Other**. If the roadway segment has multiple roadway system classifications identified, select the classification that exists for the longest portion of the roadway segment. This input provides for an additional sorting of "Highways" projects by roadway system for cases where specific funding streams exist *(dropdown input)*.

- **Estimated Cost of Project***:* Estimated total project cost in dollars *(manual input)*.

G1.2.2 "Bridge/Tunnel" Project Background Inputs

- **Project Name***:* The "Bridge/Tunnel" project name *(manual input)*.

- **Primary Jurisdiction***:* Indicates the primary jurisdiction where the project will be located *(dropdown input)*. Select the appropriate jurisdiction from the drop-down menu for the following scenarios:
    - Project is located in one jurisdiction – Choose the appropriate jurisdiction from the drop-down menu.
    - Project is located in two or more jurisdictions – Choose Multiple Jurisdictions from the drop-down menu.

- **Improvement Description***:* A short description of the type of work proposed with the project *(manual input)*. Examples for input include:
    - Widening – Indicate the number of existing and proposed lanes
    - New Alignment – Indicate the proposed laneage
    - Widening and New Alignment
    - Improvements
    - Replacement

- **Length***:* Total length of the project in miles *(manual input)*.

- **Existing ADT***:* Existing ADT volumes are the current year average 24-hour, bidirectional volumes throughout the project limits. If the roadway segments for a project area do not currently exist, manually enter zero for this input *(manual input)*.

- **Future ADT:** Future ADT volumes are the forecasted future year (currently 2030) average bidirectional, 24-hour volumes throughout the project limits *(manual input)*.

- **Existing V/C Ratio***:* The ratio of existing ADT volumes to the average existing daily capacity of the roadway segments throughout the study area. V/C ratios less than 1.0 indicate a roadway segment operating under capacity. V/C ratios greater than 1.0 indicate a roadway segment operating over capacity. If the roadway segment does not currently exist, manually enter 0.00 for this input *(manual input)*.

- **Forecasted V/C Ratio***:* The ratio of future ADT volumes to the average future daily capacity of the roadway segments throughout the study area. V/C ratios less than 1.0 indicate a roadway segment operating under capacity. V/C ratios greater than 1.0 indicate a roadway segment operating over capacity *(manual input)*.

- **Future Daily VMT***:* Average 24-hour volume in each direction throughout the project limits in Year 2030 **(Future ADT)** multiplied by the **Length** of the roadway segment *(reference input)*.

- **Total Crashes in Past Three Years***:* Total number of crashes occurring within the project limits, in each direction, during the past three years. Crash data may be obtained from VDOT, the DMV, or local jurisdictions. It is recommended that entire years of data be used for input. Therefore, if the

current date is June 15, 2009, then use the total number of crashes which occurred within the project limits from January 1, 2006 through December 31, 2008. If the roadway segment does not currently exist, manually enter a zero *(manual input)*.

- **Jurisdictional Average Crash Rate (Per Million VMT)***:* Jurisdictional average crash rate per million vehicle miles traveled for all roadway segments within the project area. If the project is proposed under multiple jurisdictions, average the crash rates from each jurisdiction. The jurisdictional average crash rate per million vehicle miles traveled may be obtained from the HRTPO, VDOT, or the local jurisdiction *(manual input)*.

- **Roadway System Classification***:* Existing roadway system classification, as per VDOT, of the roadway segments included within the project area selected from a drop-down menu. Roadway system classification types provided in the drop-down menu include **Interstate, Primary, Secondary, Urban,** and **Other**. If the roadway segment has multiple roadway system classifications identified, select the classification that exists for the longest portion of the roadway segment. This input provides for an additional sorting of "Highways" projects by roadway system for cases where specific funding streams exist *(dropdown input)*.

- **Bridge or Tunnel Project***:* The project type (bridge or tunnel), selected from the provided dropdown menu *(dropdown input)*.

- **Estimated Cost of Project***:* Estimated total project cost in dollars *(manual input)*.

G1.2.3 "Bicycle and Pedestrian" Project Background Inputs

- **Project Name***:* The "Bicycle and Pedestrian" project name *(manual input)*.

- **From** and **To***:* The geographical reference point of where the project begins and ends. Examples of geographical reference points include intersecting roadway, milepost, physical boundary, or political boundary. If the project does not have geographical physical limits, leave the fields blank. Blank fields for these inputs do not have a bearing on project scoring *(manual input)*.

- **Primary Jurisdiction***:* Indicates the primary jurisdiction where the project will be located *(dropdown input)*. Select the appropriate jurisdiction from the drop-down menu for the following scenarios:
    - Project is located in one jurisdiction – Choose the appropriate jurisdiction from the drop-down menu.
    - Project is located in two or more jurisdictions – Choose Multiple Jurisdictions from the drop-down menu.

- **Improvement Description***:* A short description of the type of work proposed with the project *(manual input)*. Examples for input include:

- Bicycle Improvements
- Pedestrian Improvements
- Bicycle and Pedestrian Improvements
- New Bikeway
- New Pedestrian Facility

- **Population within a 1.5-Mile Radius of Project***:* Population served by the project within a 1.5-mile radius, which should only include people residing no further than 1.5 miles from the project area *(manual input)*.

- **Length***:* Total length of the project in miles. The distance entered should be the distance between the geographical reference points listed in the **From** and **To** data columns. If no values are entered into the **From** and **To** columns, leave the field blank *(manual input)*.

- **Estimated Cost of Project***:* Estimated total project cost in dollars *(manual input)*.

G1.2.4 "Systems Management/Transportation Demand Management/Operational Improvements" Project Background Inputs

- **Project Name***:* The "Systems Management/TDM/Operational Improvements" project name *(manual input)*.

- **From** and **To***:* The geographical reference point of where the project begins and ends. Examples of geographical reference points include intersecting roadway, milepost, physical boundary, or political boundary. If the project does not have geographical physical limits, leave the fields blank. Blank fields for these inputs do not have a bearing on project scoring *(manual input)*.

- **Primary Jurisdiction***:* Indicates the primary jurisdiction where the project will be located *(dropdown input)*. Select the appropriate jurisdiction from the drop-down menu for the following scenarios:
  - Project is located in one jurisdiction – Choose the appropriate jurisdiction from the drop-down menu.
  - Project is located in two or more jurisdictions – Choose Multiple Jurisdictions from the drop-down menu.

- **Systems Management, TDM, or Operational Improvement Project***:* Indicates the project type (systems management, TDM, or operational improvements) from the provided drop-down menu *(dropdown input)*.

- **Length***:* Total length of the project in miles. The distance entered should be the distance between the geographical reference points listed in the **From** and **To** data columns. If no values are entered into the **From** and **To** columns, leave the field blank *(manual input)*.

- **Estimated Cost of Project***:* Estimated total project cost in dollars *(manual input)*.

G1.2.5 "Transit" Project Background Inputs

- **Project Name***:* The "Transit" project name *(manual input)*.

- **From** and **To***:* The geographical reference point of where the project begins and ends. Examples of geographical reference points include intersecting roadway, milepost, physical boundary, or political boundary. If the project does not have geographical physical limits, leave the fields blank. Blank fields for these inputs do not have a bearing on project scoring *(manual input)*.

- **Primary Jurisdiction***:* Indicates the primary jurisdiction where the project will be located *(dropdown input)*. Select the appropriate jurisdiction from the drop-down menu for the following scenarios:
    - Project is located in one jurisdiction – Choose the appropriate jurisdiction from the drop-down menu.
    - Project is located in two or more jurisdictions – Choose Multiple Jurisdictions from the drop-down menu.

- **Estimated Annual Ridership***:* Total estimated number of people expected to use the transit service annually if the project was constructed or the current estimated number of people using an existing transit service if the project improves an existing service/facility *(manual input)*.

- **Length***:* Total length of the project in miles. The distance entered should be the distance between the geographical reference points listed in the **From** and **To** data columns. If no values are entered into the **From** and **To** columns, leave the field blank *(manual input)*.

- **Estimated Total Capital Cost of Project (Annualized)***:* Cost to purchase required right-of-way, design, construct, and/or implement the transit service divided by the total expected life of the project *(manual input)*.

- **Estimated Total Operating/Maintenance Cost of Project (Annualized)***:* Cost to maintain the transit service divided by the total expected life of the project *(manual input).*

G1.2.6 "Intermodal" Project Background Inputs

- **Project Name***:* The "Intermodal" project name *(manual input)*.

- **From** and **To:** The geographical reference point of where the project begins and ends. Examples of geographical reference points include intersecting roadway, milepost, physical boundary, or political boundary. If the project does not have geographical physical limits, leave the fields blank. Blank fields for these inputs do not have a bearing on project scoring *(manual input)*.

- **Primary Jurisdiction***:* Indicates the primary jurisdiction where the project will be located *(dropdown input)*. Select the appropriate jurisdiction from the drop-down menu for the following scenarios:
    - Project is located in one jurisdiction – Choose the appropriate jurisdiction from the drop-down menu.
    - Project is located in two or more jurisdictions – Choose Multiple Jurisdictions from the drop-down menu.

- **Length***:* Total length of the project in miles. The distance entered should be the distance between the geographical reference points listed in the **From** and **To** data columns. If no values are entered into the **From** and **To** columns, leave the field blank *(manual input)*.

- **Estimated Cost of Project***:* Estimated total project cost in dollars *(manual input)*.

Appendix G2

Tool Validity Scoring Results, Sorted by each Individual Criterion

("Highways" and "Bridge/Tunnel" Categories only)

Highway Projects Sorted by Individual Criteria

Highways - Congestion Level

Project Name	Score	Rank
Princess Anne Road and Nimmo Parkway	20.10	1
I-64 Widening (Peninsula)	20.00	2
I-264 Interchange Improvements	19.54	3
Route 17 (York County)	18.94	4
I-64/Norview Avenue Interchange	18.50	5
Wesleyan Drive	17.73	6
Route 17 (J. Clyde Morris Boulevard)	17.33	7
I-64 Widening (Southside)	14.37	8
Southeastern Parkway	10.00	9
Lynnhaven 11	8.33	10
Nansemond Parkway - Portsmouth Boulevard	8.12	11
Route 60 Relocation	7.33	12
Laskin Road	6.50	13
US Route 460	6.07	14
Hanbury Road	6.02	15
Wythe Creek Road (includes Bridge Widening)	5.80	16
US Route 58 - Holland Road	5.02	17
Ironbound Road	4.22	18
Commander Shepard Boulevard Extension	3.33	19

Highways - System Continuity and Connectivity

Project Name	Score	Rank
I-264 Interchange Improvements	25.00	1
I-64 Widening (Southside)	25.00	1
I-64 Widening (Peninsula)	25.00	1
US Route 460	25.00	1
US Route 58 - Holland Road	25.00	1
Southeastern Parkway	25.00	1
Commander Shepard Boulevard Extension	16.75	7
Route 60 Relocation	16.75	7
Route 17 (J. Clyde Morris Boulevard)	16.75	7
I-64/Norview Avenue Interchange	16.75	7
Wythe Creek Road (includes Bridge Widening)	16.75	7
Nansemond Parkway - Portsmouth Boulevard	16.75	7
Lynnhaven 11	16.75	7
Hanbury Road	8.25	14
Wesleyan Drive	8.25	14
Laskin Road	8.25	14
Princess Anne Road and Nimmo Parkway	8.25	14
Ironbound Road	8.25	14
Route 17 (York County)	8.25	14

Highways - Cost Effectiveness

Project Name	Score	Rank
Route 60 Relocation	15.00	1
I-64/Norview Avenue Interchange	15.00	1
Wesleyan Drive	15.00	1
I-264 Interchange Improvements	15.00	1
Route 17 (York County)	15.00	1
US Route 58 - Holland Road	14.57	6
I-64 Widening (Peninsula)	13.00	7
Route 17 (J. Clyde Morris Boulevard)	10.28	8
Lynnhaven 11	10.16	9
Laskin Road	10.04	10
Wythe Creek Road (includes Bridge Widening)	9.93	11
Princess Anne Road and Nimmo Parkway	8.94	12
Hanbury Road	8.04	13
Ironbound Road	6.88	14
Nansemond Parkway - Portsmouth Boulevard	6.81	15
I-64 Widening (Southside)	4.50	16
Commander Shepard Boulevard Extension	3.50	17
US Route 460	3.16	18
Southeastern Parkway	0.00	19

Highways - Land Use Compatibility

Project Name	Score	Rank
Hanbury Road	10.00	1
Commander Shepard Boulevard Extension	10.00	1
Route 60 Relocation	10.00	1
Route 17 (J. Clyde Morris Boulevard)	10.00	1
Wesleyan Drive	10.00	1
Nansemond Parkway - Portsmouth Boulevard	10.00	1
Laskin Road	10.00	1
Princess Anne Road and Nimmo Parkway	10.00	1
Lynnhaven 11	10.00	1
Ironbound Road	10.00	1
I-64 Widening (Southside)	10.00	1
I-64 Widening (Peninsula)	10.00	1
US Route 58 - Holland Road	10.00	1
Southeastern Parkway	10.00	1
I-64/Norview Avenue Interchange	5.00	15
Wythe Creek Road (includes Bridge Widening)	5.00	15
I-264 Interchange Improvements	5.00	15
Route 17 (York County)	5.00	15
US Route 460	5.00	15

Highways - Safety and Security

Project Name	Score	Rank
US Route 58 - Holland Road	8.07	1
Route 17 (York County)	7.09	2
US Route 460	6.40	3
Hanbury Road	6.25	4
I-64/Norview Avenue Interchange	6.00	5
I-264 Interchange Improvements	6.00	5
Route 60 Relocation	5.25	7
Nansemond Parkway - Portsmouth Boulevard	5.25	7
I-64 Widening (Southside)	5.25	7
I-64 Widening (Peninsula)	5.25	7
Route 17 (J. Clyde Morris Boulevard)	4.50	11
Laskin Road	4.50	11
Wesleyan Drive	4.00	13
Wythe Creek Road (includes Bridge Widening)	3.00	14
Princess Anne Road and Nimmo Parkway	1.50	15
Lynnhaven 11	1.50	15
Ironbound Road	1.50	15
Commander Shepard Boulevard Extension	0.00	18
Southeastern Parkway	0.00	18

Highways - Infrastructure Pavement Condition

Project Name	Score	Rank
Laskin Road	5.00	1
Princess Anne Road and Nimmo Parkway	5.00	1
I-264 Interchange Improvements	5.00	1
Route 17 (York County)	5.00	1
I-64 Widening (Southside)	5.00	1
Route 60 Relocation	3.75	6
Nansemond Parkway - Portsmouth Boulevard	3.75	6
US Route 58 - Holland Road	3.75	6
Hanbury Road	2.50	9
Route 17 (J. Clyde Morris Boulevard)	2.50	9
I-64/Norview Avenue Interchange	2.50	9
Wesleyan Drive	2.50	9
Wythe Creek Road (includes Bridge Widening)	2.50	9
Ironbound Road	2.50	9
I-64 Widening (Peninsula)	2.50	9
US Route 460	2.50	9
Commander Shepard Boulevard Extension	0.00	17
Lynnhaven 11	0.00	17
Southeastern Parkway	0.00	17

Highway Projects Sorted by Individual Criteria

Highways - Modal Enhancements		
Project Name	Score	Rank
US Route 58 - Holland Road	4.00	1
Wythe Creek Road (includes Bridge Widening)	3.00	2
I-264 Interchange Improvements	3.00	2
I-64 Widening (Southside)	3.00	2
I-64 Widening (Peninsula)	3.00	2
Southeastern Parkway	3.00	2
Commander Shepard Boulevard Extension	2.00	7
Route 60 Relocation	2.00	7
I-64/Norview Avenue Interchange	2.00	7
Wesleyan Drive	2.00	7
Nansemond Parkway - Portsmouth Boulevard	2.00	7
Laskin Road	2.00	7
Princess Anne Road and Nimmo Parkway	2.00	7
Lynnhaven 11	2.00	7
Ironbound Road	2.00	7
US Route 460	2.00	7
Hanbury Road	1.00	17
Route 17 (York County)	1.00	17
Route 17 (J. Clyde Morris Boulevard)	0.00	19

Highways - Project Viability		
Project Name	Score	Rank
Princess Anne Road and Nimmo Parkway	50.00	1
US Route 58 - Holland Road	50.00	1
US Route 460	47.50	3
Commander Shepard Boulevard Extension	40.00	4
Lynnhaven 11	35.00	5
Wesleyan Drive	30.00	6
I-64 Widening (Southside)	15.00	7
I-64 Widening (Peninsula)	15.00	7
Hanbury Road	10.00	9
Route 60 Relocation	10.00	9
Route 17 (J. Clyde Morris Boulevard)	10.00	9
I-64/Norview Avenue Interchange	10.00	9
Wythe Creek Road (includes Bridge Widening)	10.00	9
Nansemond Parkway - Portsmouth Boulevard	10.00	9
Laskin Road	10.00	9
Route 17 (York County)	10.00	9
Southeastern Parkway	10.00	9
I-264 Interchange Improvements	0.00	18
Ironbound Road	0.00	18

Bridge/Tunnel Projects Sorted by Individual Criteria

Bridge/Tunnel - Congestion Level

Project Name	Score	Rank
Hampton Roads Bridge Tunnel	26.39	1
Dominion Boulevard	26.23	2
Midtown Tunnel, MLK Extension	22.20	3
Hampton Roads Third Crossing (I-664 widening)	10.00	4
Lesner Bridge	7.53	5
James River Bridge Improvements	7.50	6
Blackwater Bridge Replacement	0.33	7
Hampton Roads Third Crossing (E-W connection)	0.00	8

Bridge/Tunnel - System Continuity and Connectivity

Project Name	Score	Rank
Hampton Roads Bridge Tunnel	10.00	1
Midtown Tunnel, MLK Extension	10.00	1
Hampton Roads Third Crossing (I-664 widening)	10.00	1
Hampton Roads Third Crossing (E-W connection)	10.00	1
James River Bridge Improvements	6.75	5
Dominion Boulevard	6.75	5
Lesner Bridge	6.75	5
Blackwater Bridge Replacement	3.50	8

Bridge/Tunnel - Cost Effectiveness

Project Name	Score	Rank
James River Bridge Improvements	15.00	1
Dominion Boulevard	15.00	1
Hampton Roads Third Crossing (I-664 widening)	15.00	1
Hampton Roads Bridge Tunnel	14.54	4
Hampton Roads Third Crossing (E-W connection)	13.33	5
Lesner Bridge	11.83	6
Midtown Tunnel, MLK Extension	11.01	7
Blackwater Bridge Replacement	0.00	8

Bridge/Tunnel - Land Use Compatibility

Project Name	Score	Rank
James River Bridge Improvements	10.00	1
Hampton Roads Bridge Tunnel	10.00	1
Midtown Tunnel, MLK Extension	10.00	1
Dominion Boulevard	10.00	1
Hampton Roads Third Crossing (I-664 widening)	10.00	1
Blackwater Bridge Replacement	5.00	6
Lesner Bridge	5.00	6
Hampton Roads Third Crossing (E-W connection)	5.00	6

Bridge/Tunnel - Safety and Security

Project Name	Score	Rank
Midtown Tunnel, MLK Extension	7.50	1
Dominion Boulevard	7.50	1
Lesner Bridge	7.50	1
Hampton Roads Bridge Tunnel	6.50	4
Blackwater Bridge Replacement	6.25	5
James River Bridge Improvements	5.50	6
Hampton Roads Third Crossing (I-664 widening)	5.50	6
Hampton Roads Third Crossing (E-W connection)	5.50	6

Bridge/Tunnel - Infrastructure Condition

Project Name	Score	Rank
Hampton Roads Bridge Tunnel	20.00	1
Lesner Bridge	20.00	1
Midtown Tunnel, MLK Extension	13.25	3
Blackwater Bridge Replacement	10.00	4
James River Bridge Improvements	10.00	4
Dominion Boulevard	10.00	4
Hampton Roads Third Crossing (I-664 widening)	0.00	7
Hampton Roads Third Crossing (E-W connection)	0.00	7

Bridge/Tunnel - Modal Enhancements

Project Name	Score	Rank
Hampton Roads Third Crossing (I-664 widening)	4.50	1
Hampton Roads Third Crossing (E-W connection)	4.50	1
Hampton Roads Bridge Tunnel	4.00	3
Midtown Tunnel, MLK Extension	4.00	3
Dominion Boulevard	4.00	3
James River Bridge Improvements	2.50	6
Lesner Bridge	1.50	7
Blackwater Bridge Replacement	0.50	8

Bridge/Tunnel - Project Viability

Project Name	Score	Rank
Midtown Tunnel, MLK Extension	90.00	1
Dominion Boulevard	60.00	2
Hampton Roads Third Crossing (I-664 widening)	32.50	3
Hampton Roads Third Crossing (E-W connection)	22.50	4
James River Bridge Improvements	10.00	5
Lesner Bridge	7.50	6
Blackwater Bridge Replacement	0.00	7
Hampton Roads Bridge Tunnel	0.00	7

Appendix H

Project Application Forms

Title

Instructions/Description

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GENERAL INFORMATION – FORM A

Primary Locality/Agency: _____	Date: _____
Prepared By: _____	Phone: _____
E-Mail: _____	Fax: _____
UPC #: _____	
Project Name: _____	

Project Location: (Brief description of project location, including project extents and length of project in miles.)

Project Description: (Brief description of project. If applicable, include additional data or maps as attachments.)

Has any additional local or other funding been committed to the project above and beyond the required local match? ☐Yes ☐No

If yes, in terms of the total project budget, what percentage of additional local or other funding has been committed? _____%

Are there any documented federal mandates requiring that the project be constructed? ☐Yes ☐No

Are all plans for the project currently complete and ready for advertisement: ☐Yes ☐No

Is the project completely funded? ☐Yes ☐No

To what level has permitting been completed?

- ☐ Right-of-Way
- ☐ EIS
- ☐ Environmental Clearance (Transit Projects Only)
- ☐ FTA Approval for Final Design (Transit Projects Only)

Project Type

Please select the associated form to complete your application.

- ☐ Highways Project (**Form B**)
- ☐ Bridge or Tunnel Project (**Form C**)
- ☐ Bicycle or Pedestrian Project (**Form D**)
- ☐ Systems Management or Operational Improvement Project (**Form E**)
- ☐ Transportation Demand Management (TDM) Project (**Form F**)
- ☐ Transit Project (**Form G**)
- ☐ Intermodal Project (**Form H**)

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Highways Project Application Form
Form B

Project Name: _____

Estimated Total Project Cost: $_____

Statewide Roadway System:

- ☐ Interstate
- ☐ Primary
- ☐ Secondary
- ☐ Urban
- ☐ Other _____

Improvement Description (Such as widening, new alignment, number of lanes, etc.):

Does the project improve an established and documented Incident Management or Evacuation Route?
☐Yes ☐No

List all documentation (approved by an elected body) which supports the project's compatibility with existing land use patterns and future plans/development.

How will the project enhance other modes of transportation?

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What geometric deficiencies currently exist in the project area? Which deficiencies will this project address?

What is the Critical Condition Index (CCI) of the subject roadway? _____

(Optional) How will the project impact the continuity and connectivity of the region's transportation network?

(Optional) How will the project improve vehicular access to freight distribution facilities, ports, major industrial clients, or employment/population centers?

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Bridge or Tunnel Application Form
Form C

Project Name: _____

Estimated Total Project Cost: $_____

Statewide Roadway System:

- ☐ Interstate
- ☐ Primary
- ☐ Secondary
- ☐ Urban
- ☐ Other _____

Improvement Description (Such as widening, new alignment, number of lanes, etc.):

Does the project improve an established and documented Incident Management or Evacuation Route?
☐Yes ☐No

Will the project provide a continuous maritime crossing? ☐Yes ☐No

How will the project enhance other modes of transportation?

What geometric deficiencies currently exist in the project area? Which deficiencies will this project address?

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(Optional) How will the project impact the continuity and connectivity of the region's transportation network?

(Optional) How will the project improve vehicular access to freight distribution facilities, ports, major industrial clients, or employment/population centers?

TUNNEL PROJECTS ONLY
What is the age of the subject tunnel? _____ years old When was the last major repair ($5M or more) completed for the subject tunnel? _____ What is the estimated cost of necessary repairs for the subject tunnel? _____

BRIDGE PROJECTS ONLY
What is the Bridge Sufficiency Rating of the subject bridge? _____

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Bicycle or Pedestrian Project Application Form
Form D

Project Name: _____

Estimated Cost of Project: $_____

How does the project eliminate barriers to bicyclists/pedestrians? If the project completes a gap across a major barrier (e.g., street), please specify.

Will the project connect at least two existing bicycle or pedestrian facilities? ☐Yes ☐No

How will the project enhance access to transit, local, or regional destinations? (e.g. schools, employment centers, parks, or high density residential areas)

Is the project being completed to improve/address existing safety concerns? ☐Yes ☐No

How will this project enhance other modes of transportation?

List all documentation (approved by an elected body) which supports the project's compatibility with existing land use patterns and future plans/development.

(Optional) How will the project impact the continuity and connectivity of the region's bicycle/pedestrian network?

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Systems Management or Operational Improvement Project Application Form
Form E

Project Name: _____

Estimated Cost of Project: $_____

Project Type: ☐ Systems Management Project

☐ Operational Improvement Project

Does the project improve an established and documented Incident Management or Evacuation Route?
☐Yes ☐No

Does the project include the implementation of Emergency Vehicle Preemption or Incident Detection Systems?
☐Yes ☐No

How will the project reduce the number of crashes?

Is the project officially documented within the Regional ITS Strategic Plan? ☐Yes ☐No

How will the project improve communications amongst various operating agencies?

How will the project enhance other modes of transportation?

(Optional) How will the project impact mobility or accessibility needs with the region?

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Transportation Demand Management (TDM) Project Application Form
Form F

Project Name: _____

Estimated Cost of Project: $_____

Does the project improve an established and documented Incident Management or Evacuation Route?
☐Yes ☐No

Does the project include the implementation of Emergency Vehicle Preemption or Incident Detection Systems?
☐Yes ☐No

How will the project reduce the number of crashes?

Is the project officially documented within the Regional ITS Strategic Plan? ☐Yes ☐No

How will the project improve communications amongst various operations agencies?

How will the project enhance other modes of transportation?

(Optional) How will the project impact mobility or accessibility needs with the region?

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List any new projected employers who would offer TDM Programs with this project (specify TDM Program with employer).

If the project is implemented, what is the projected total percentage of employees who would participate in ridesharing initiatives? _____% If the project is implemented, what is the projected total percentage of employees who would walk/bike to work? _____%

Will the project incorporate any parking management strategies (such as long- vs. short-term parking, special carpool/hybrid parking, or the implementation of parking fees)? Explain.

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Transit Project Application Form
Form G

Project Name: _____

Project Cost:

Estimated Total Capital Cost of Project (Annualized): $_____

Estimated Total Operating Cost of Project (Annualized): $_____

This is a(n): ☐ New Project

- If new, what is the Forecasted **Daily** Ridership? _____

☐ Improvement to an existing route/service

- If existing, what is the Existing **Daily** Ridership? _____

Estimated **Annual** travel time savings per rider if project is completed: _____

Estimated **Annual** Ridership (Proposed): _____

Estimated frequency of service? _____

List all documentation (approved by an elected body) which supports the project's compatibility with existing land use patterns and future plans/development.

How will this project enhance other modes of transportation?

(Optional) How will the project impact the continuity and connectivity of the region's transit network?

(Optional) How will the project improve transit access to freight distribution facilities, ports, major industrial clients, or employment/population centers?

Intermodal Project Application Form
Form H

Project Name: _____

Project Financials:
Estimated Total Project Cost: $_____
Estimated Increase in Revenue with the Proposed Project: $_____

How will the project improve access to freight distribution facilities, ports, major industrial clients, or employment/population centers?

How will this project enhance other modes of transportation?

(Optional) How will this project better accommodate intermodal movements by reducing or removing conflicts between intermodal movements?

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Appendix I

Tool Validation Analysis for Project Utility and Project Viability Components

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Appendix I – Tool Validation Analysis

In order to test the validation of the prioritization tool's methodology and structure, a tool validation analysis was previously performed considering the project utility and project viability components. The tool validation analysis was performed on a sampling of 41 initial projects spanning all six project categories. The projects included both regionally significant mega projects such as the Hampton Roads Bridge-Tunnel and the Widening of I-64 (Southside and Peninsula) and local/multijurisdictional projects including minor road widenings and bike paths. The end goal of this validation test was to ensure the validity and reliability of the resulting tool's output from a collection of sample transportation improvement projects. A more detailed description of the tool validation projects is provided below, followed by a description of the analysis procedure and results.

I.1 Tool Validation Projects

The tool validation project selection process was a key step in evaluating the tool's effectiveness; validity of the categories, criteria, and MOEs; and reasonableness of results. The initial list of 41 tool validation projects was refined several times through multiple discussions and meetings with the Steering Committee, TTAC, TAC, and HRTPO Board. However, throughout all of the revisions, there were three guidelines associated with the selection of tool validation projects that were maintained:

1. **Eligibility**: Only projects that had not been started were eligible. Projects or portions of projects which were already started or completed could not be considered. Additionally, there were 12 projects specifically listed in the scope of services which needed to be included in the tool validation analysis. These 12 projects are discussed in more detail later in this chapter.
2. **Variety**: At least three projects were required within each category. Without at least three, a sensible comparison of project scores could not be made to ensure that all weighting factors and MOEs were adequate.
3. **Representation**: The Program Prioritization tool needed to be evaluated based on an equitable representation of the entire HRTPO community such that each of the agencies/localities had at least one project included in the tool validation analysis. This is a critical objective to provide a methodology and tool which will be ultimately adopted, consensus-based, and beneficial to all municipalities within the region.

There were 12 projects identified during the initial scoping meetings to be included in the tool validation analysis. These projects were selected to evaluate the tool methodology and include the following:

- I-64 Widening (Peninsula)
- I-64 Widening (Southside)
- Southeastern Parkway/Dominion Boulevard
- U.S. Route 460
- U.S. Route 58 (Holland Road)
- Hampton Roads Bridge-Tunnel
- Midtown Tunnel, MLK Extension
- Phases 1 and 2 of the Hampton Roads Third Crossing
- Lesner Bridge
- Intermodal Connector + Chambers Interchange
- Virginia Beach Light Rail Transit Extension
- Peninsula Fixed Guideway

Throughout the tool validation analysis, it was recommended that the Hampton Roads Third Crossing and the Southeastern Parkway/Dominion Boulevard projects be evaluated as four individual projects so that the merits of each phase could be evaluated. This brings the new grand total to 43 projects in the tool validation project list.

Hampton Roads Third Crossing:

1. ***Hampton Roads Third Crossing Phase 1****:* Includes the widening of I-664 from Coliseum Drive, through the Monitor-Merrimac Memorial Bridge-Tunnel, to Bowers Hill and the interchange of I-64/I-264
2. ***Hampton Roads Third Crossing Phase 2****:* Includes the East-West Connection from the Monitor-Merrimac Memorial Bridge-Tunnel to I-564

Southeastern Parkway/Dominion Boulevard:

1. ***Southeastern Parkway:*** This project includes only the Southeastern Parkway project
2. ***Dominion Boulevard:*** This project includes the improvements to the Steel Bridge and along Dominion Boulevard

There were 29 other projects evaluated in addition to the previously listed 14. These additional projects included:

- I-264 Interchange Improvements
- I-64/Norview Avenue Interchange Improvements
- Route 17 – J. Clyde Morris Boulevard
- Route 60 Relocation
- Princess Anne Road/Nimmo Parkway
- Route 17 – York County
- Wesleyan Drive
- Laskin Road
- Nansemond Road – Portsmouth Boulevard
- Lynnhaven 11
- Hanbury Road
- Commander Shepard Boulevard Extension
- Wythe Creek Road
- Ironbound Road
- James River Bridge Improvements
- Blackwater Bridge Replacement
- I-264 ITS Improvements
- Traffix Program
- Atlantic Avenue Trolley – ITS/Special Events
- Route 58 Business (3 Signals)
- Longhill Road – Paved Shoulder Bikeway
- Smithfield to Nike Park Bike/Ped Improvements
- Capital Landing Road Bikeway
- Route 216 Bike/Ped Improvements
- Naval Base Norfolk Fixed Guideway Extension
- WATA Bus Replacement (16 Buses)
- WATA Jamestown Bus Route
- Terminal Boulevard Grade Separation
- Craney Island Access Road

A complete list of the 43 projects, including their respective jurisdictions and project categories, is included in **Figure 1** and illustrated by location in **Figure 2**. Please note that the four italicized projects in the list account for two of the initial 41 projects which were later divided into four separate projects.

FINAL TOOL VALIDATION PROJECT LIST		
Locality	**Project**	**Category**
Gloucester County	Route 216 Bike/Ped Improvements	Bike/Ped
Isle of Wight County	Smithfield to Nike Park Bike/Ped Improvements	Bike/Ped
James City County	Longhill Road - Paved Shoulder Bikeway	Bike/Ped
York County	Capitol Landing Road Bikeway	Bike/Ped
Isle of Wight	Blackwater Bridge Replacement	Bridge/Tunnel
MULTI	James River Bridge Improvements	Bridge/Tunnel
MULTI	Hampton Roads Bridge Tunnel (HRBT)	Bridge/Tunnel
MULTI	Midtown Tunnel, MLK Extension	Bridge/Tunnel
Chesapeake	***Dominion Boulevard***	***Bridge/Tunnel***
Virginia Beach	Lesner Bridge	Bridge/Tunnel
MULTI	***Phase 1 of the Third Crossing (I-664 Widening)***	***Bridge/Tunnel***
MULTI	***Phase 2 of the Third Crossing (E-W Connector)***	***Bridge/Tunnel***
Chesapeake	Hanbury Road	Highways
Hampton	Commander Sheppard Blvd Extension	Highways
James City County	Route 60 Relocation	Highways
Newport News	Route 17 (J Clyde Morris Blvd)	Highways
Norfolk	I-64 / Norview Ave. Interchange Ramp Improvements	Highways
Virginia Beach/Norfolk	Wesleyan Drive	Highways
Poquoson/Hampton	Wythe Creek Road (includes bridge widening)	Highways
Suffolk/Chesapeake	Nansemond Pkwy - Portsmouth Boulevard	Highways
Virginia Beach	Laskin Road	Highways
Virginia Beach	Princess Anne Road and Nimmo Parkway	Highways
Virginia Beach	I-264 Interchange Improvements	Highways
Virginia Beach	Lynnhaven 11	Highways
Williamsburg	Ironbound Road	Highways
York County	Route 17 (York County)	Highways
MULTI	I-64 Widening - Southside	Highways
MULTI	I-64 Widening - Peninsula	Highways
MULTI	U.S. Route 460	Highways
Suffolk	U.S. Route 58 – Holland Road	Highways
MULTI	***Southeastern Parkway***	***Highways***
Norfolk	Terminal Boulevard Grade Separation	Intermodal
Portsmouth	Craney Island Access Road	Intermodal
Norfolk	Intermodal Connector + Chambers Interchange (I-564)	Intermodal
HRT	Traffix Program	SysOps/TDM
MULTI	I-264 ITS: Replace 10 VMS & 10 LSC	SysOps/TDM
Suffolk	Route 58 Business - 3 Signals	SysOps/TDM
Virginia Beach	Atlantic Avenue Trolley - ITS/Special Events	SysOps/TDM
HRT	Naval Base Norfolk Fixed Guideway Extension	Transit
Newport News	Peninsula Fixed Guideway	Transit
WATA	Proposed Jamestown Bus Route	Transit
WATA	WATA Bus Replacement (16 Buses)	Transit
Virginia Beach/HRT	Virginia Beach Transit Extension	Transit

Figure 1 - Complete List of Tool Validation Projects

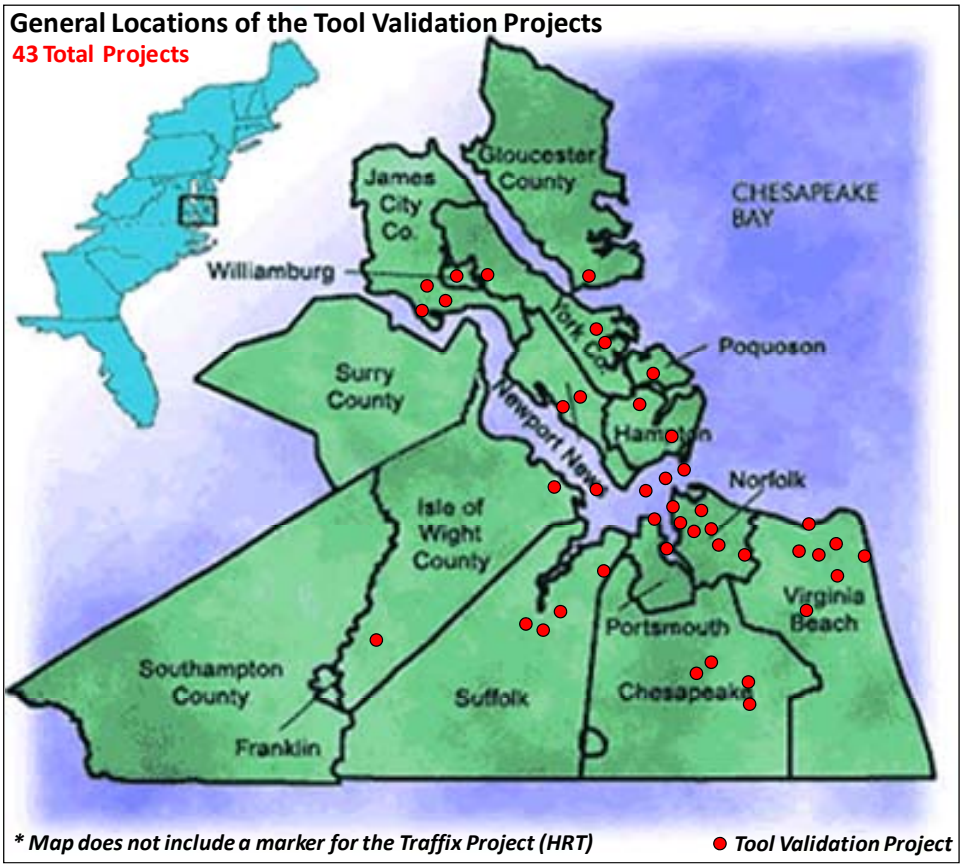

Figure 2 - Tool Validation Project Locations in Hampton Roads

It should be noted that in the future, the large mega projects could be segmented into several smaller projects that are more manageable from a financing and construction standpoint; however with exception to the Hampton Roads Third Crossing, they were kept as single, large projects to evaluate the reasonableness of the input assumptions and subsequent tool output.

I.2 Tool Validation Results

The tool validation analysis involved three main steps. The first was to input all MOEs and weighting factors into the weighting factors tab. It is anticipated that inputs for this tab will be reevaluated periodically when the LRTP is updated or when specific project inputs need to be addressed. The second step was to enter the data for each of the 43 projects into their respective category tabs. This step also involved entering all of the necessary project inputs outlined in **Appendix G1**. For the tool validation analysis, each category and each evaluation criterion was completed by either manual entry or by choosing from the dropdown menu.

Once all project data were entered into the tool, the three results tabs were activated, and the project scores were sorted in descending order from highest to lowest for both the utility score and viability grade. Results were first examined by category to evaluate where the projects were ranked in their category on a comprehensive level. An additional evaluation also was made for both the “Highways” and “Bridge/Tunnel” categories to sort projects by individual evaluation criteria and VDOT roadway system.

This was done not only to examine how the chosen MOE thresholds and weighting factors were being applied to the overall score and to see if the MOEs for any criteria needed to be further refined, but also to observe how similar projects compared amongst one another. Furthermore by performing this subsequent sorting, projects were able to be evaluated based on individual characteristics and benefits.

This analysis process was very iterative and was performed multiple times in order to fine tune the thresholds and weighting factors for project utility and project viability MOEs according to direction provided by the Steering Committee, TTAC, and HRTPO Board. Revisions included adjusting both MOEs and weighting factors throughout the tool development process. Some of the more significant modifications involved the elimination of certain criteria and the reallocation of points to the remaining criteria. It is important to understand that this is a living methodology and that MOEs and weighting factors will continue to evolve and be modified as more data are obtained and evaluation criteria preferences change.

Results from the tool validation analysis are summarized in **Figures 3 through 14**. Detailed results for the "Highways" and "Bridge/Tunnel" categories, scored and sorted by individual evaluation criterion, are included in **Appendix G2**.

Project Name	Utility Score	CLASS	Utility Rank
I-64 Widening (Peninsula)	78.75	INTERSTATE	1
I-264 Interchange Improvements	78.54	INTERSTATE	2
I-64 Widening (Southside)	67.12	INTERSTATE	3
I-64/Norview Avenue Interchange	65.75	INTERSTATE	4
US Route 58 - Holland Road	70.41	PRIMARY	1
Route 17 (York County)	60.28	PRIMARY	2
US Route 460	50.13	PRIMARY	3
Southeastern Parkway	48.00	SECONDARY	1
Route 17 (J. Clyde Morris Boulevard)	61.36	URBAN	1
Route 60 Relocation	60.08	URBAN	2
Wesleyan Drive	59.48	URBAN	3
Princess Anne Road and Nimmo Parkway	55.79	URBAN	4
Nansemond Parkway - Portsmouth Boulevard	52.68	URBAN	5
Lynnhaven 11	48.74	URBAN	6
Laskin Road	46.29	URBAN	7
Wythe Creek Road (includes Bridge Widening)	45.98	URBAN	8
Hanbury Road	42.06	URBAN	9
Commander Shepard Boulevard Extension	35.58	URBAN	10
Ironbound Road	35.35	URBAN	11

Figure 3 – "Highways" Tool Validation Results for Project Utility (Sorted by Roadway System)

Project Name	Viability Grade	CLASS
I-64 Widening (Southside)	D	INTERSTATE
I-64 Widening (Peninsula)	D	INTERSTATE
I-64/Norview Avenue Interchange	E	INTERSTATE
I-264 Interchange Improvements	E	INTERSTATE
US Route 58 - Holland Road	A	PRIMARY
US Route 460	B	PRIMARY
Route 17 (York County)	E	PRIMARY
Southeastern Parkway	E	SECONDARY
Princess Anne Road and Nimmo Parkway	A	URBAN
Commander Shepard Boulevard Extension	B	URBAN
Wesleyan Drive	C	URBAN
Lynnhaven 11	C	URBAN
Hanbury Road	E	URBAN
Route 60 Relocation	E	URBAN
Route 17 (J. Clyde Morris Boulevard)	E	URBAN
Wythe Creek Road (includes Bridge Widening)	E	URBAN
Nansemond Parkway - Portsmouth Boulevard	E	URBAN
Laskin Road	E	URBAN
Ironbound Road	E	URBAN

Figure 4 – "Highways" Tool Validation Results for Project Viability (Sorted by Roadway System)

From the "Highways" results, it can be seen that the overall spread is approximately 43 points, indicating that the evaluation criteria, MOEs, and weighting factors are adequately differentiating between projects. The top four projects based on the project utility component scores (I-64 Widening on the Peninsula, I-264 Interchange Improvements, U.S. 58 – Holland Road, and I-64 Widening on the Southside) are relatively similar in total score (within approximately 11 points). Of these top four, U.S. 58 – Holland Road receives a viability grade of A, the two I-64 Widening projects receive a D, and I-264 Interchange Improvements receives an E. Through a more thorough examination of project utility component scores by roadway system classification, all interstate projects are relatively close in score, while the point spread between the urban roadway projects is approximately 26 points. In terms of Project Viability, none of the interstate projects are seen to be very viable, while both the U.S. Route 58 and Princess Anne Road/Nimmo Parkway projects received a Viability Grade of A. Of the 14 initially determined projects, five are included within "Highways." Despite relatively small sample sizes of each functional class, these five projects are observed to be within the top three of their respective classifications for both project utility and project viability and are reasonable results when compared to the other projects.

Project Name	Utility Score	CLASS	Utility Rank
Hampton Roads Bridge Tunnel	91.43	INTERSTATE	1
Hampton Roads Third Crossing (I-664 widening)	55.00	INTERSTATE	2
Midtown Tunnel, MLK Extension	77.96	OTHER	1
Blackwater Bridge Replacement	25.58	OTHER	2
Dominion Boulevard	79.48	PRIMARY	1
Hampton Roads Third Crossing (E-W connection)	38.33	PRIMARY	2
Lesner Bridge	60.11	URBAN	1
James River Bridge Improvements	57.25	URBAN	2

Figure 5 – "Bridge/Tunnel" Tool Validation Results for Project Utility (Sorted by Roadway System)

Project Name	Viability Grade	CLASS
Hampton Roads Third Crossing (I-664 widening)	C	INTERSTATE
Hampton Roads Bridge Tunnel	E	INTERSTATE
Midtown Tunnel, MLK Extension	A	OTHER
Blackwater Bridge Replacement	E	OTHER
Dominion Boulevard	A	PRIMARY
Hampton Roads Third Crossing (E-W connection)	D	PRIMARY
James River Bridge Improvements	E	URBAN
Lesner Bridge	E	URBAN

Figure 6 – "Bridge/Tunnel" Tool Validation Results for Project Viability (Sorted by Roadway System)

The "Bridge/Tunnel" project scores show the Hampton Roads Bridge-Tunnel receiving the highest utility score (91.43); however, given the cost and complex permitting process, it only receives a viability grade of E. The Blackwater Bridge Replacement has the lowest utility score (25.58) and receives an E grade for viability. These both appear to be reasonable results when compared to the other projects. Of the eight "Bridge/Tunnel" projects, six are part of the 14 initially determined projects previously described. Despite relatively small sample sizes for each roadway system classification, the projects with the highest utility score from each of the four reported classes are one of these six. Results illustrate that the top four "Bridge/Tunnel" projects are four of the six major projects. The remaining two major projects rank 6th and 7th.

Project Name	Utility Score	Utility Rank
Longhill Road - Paved Shoulder Bikeway	60.19	1
Smithfield to Nike Park Bike/Ped Improvements	58.88	2
Capital Landing Road Bikeway	48.57	3
Route 216 Bike/Ped Improvements	26.56	4

Figure 7 – "Bicycle and Pedestrian" Tool Validation Results for Project Utility

Project Name	Viability Grade
Route 216 Bike/Ped Improvements	E
Smithfield to Nike Park Bike/Ped Improvements	E
Longhill Road - Paved Shoulder Bikeway	E
Capital Landing Road Bikeway	E

Figure 8 – "Bicycle and Pedestrian" Tool Validation Results for Project Viability

The "Bicycle and Pedestrian" results indicate that the Longhill Road Paved Shoulder Bikeway and the Smithfield to Nike Park Bike/Ped Improvements are only separated by approximately 1.5 points. The remaining two projects are not relatively close and are approximately 12 and 33 points from the highest overall project score, respectively. All four "Bicycle and Pedestrian" projects receive the same viability grade of E, which implies that funding and design plans will require significant effort to move towards construction. However, given the relatively low cost associated with these types of projects, an E does not imply that these are not viable projects, rather that they are not ready for construction. Unlike large roadway or bridge/tunnel projects, bicycle and pedestrian projects can become construction ready in a short period of time and can therefore improve from an E to a C more easily.

Project Name	Utility Score	Utility Rank
I-264 ITS: Replace 10 VMS & 10 LSC	78.88	1
Traffix Program	51.20	2
Atlantic Avenue Trolley - ITS/Special Events	49.25	3
Route 58 Buisness - 3 Signals	31.29	4

Figure 9 – "Systems Management/Transportation Demand Management/Operational Improvements" Tool Validation Results for Project Utility

Project Name	Viability Grade
Traffix Program	A
I-264 ITS: Replace 10 VMS & 10 LSC	E
Route 58 Buisness - 3 Signals	E
Atlantic Avenue Trolley - ITS/Special Events	E

Figure 10 – "Systems Management/Transportation Demand Management/Operational Improvements" Tool Validation Results for Project Viability

With regards to "Systems Management/TDM/Operational Improvements" projects, the I-264 ITS Project has the highest overall project score (78.88) but receives a viability grade of E. Like so many other projects in the list, although the benefits are substantial, the associated costs may not make the project viable. The Traffix Program and Atlantic Avenue Trolley Project are very close in total project scores (separated by approximately two points). Another positive check of the tool's validity is the Traffix Program, which is the only TDM project of the four. All TDM projects have separate exclusive criteria accounting for 25 percent of the overall project score. The remaining 75 percent comes from the other evaluation criteria common to all other projects. The results of the tool validation analysis show that TDM projects can be competitive with the other projects. It also should be noted that the Traffix Program is the only project of the four that receives an A for the viability grade.

Project Name	Utility Score	Utility Rank
Naval Base Norfolk Fixed Guideway Extension	85.60	1
Virginia Beach Transit Extension	83.83	2
Peninsula Fixed Guideway	58.89	3
Bus Replacement (16 Buses)	54.29	4
Proposed Jamestown Route	42.56	5

Figure 11 – "Transit" Tool Validation Results for Project Utility

Project Name	Viability Grade
Proposed Jamestown Route	A
Bus Replacement (16 Buses)	A
Virginia Beach Transit Extension	C
Naval Base Norfolk Fixed Guideway Extension	E
Peninsula Fixed Guideway	E

Figure 12 – "Transit" Tool Validation Results for Project Viability

The "Transit" project results indicate two distinct groups of projects. The top two projects are separated by approximately two points while the 3rd and 4th highest projects are separated by approximately 4.5 points. Both the Virginia Beach Transit Extension and the Peninsula Fixed Guideway are two of the 14 required major projects to be evaluated in the tool validation analysis and are the 2nd and 3rd highest project scores, respectively. This category is an excellent example of how the viability grade will help differentiate projects with similar numerical scores. In this case, both pairs of projects with similar scores have significantly different viability grades.

Project Name	Utility Score	Utility Rank
Intermodal Connector + Chambers Interchange (I-564)	70.00	1
Terminal Boulevard Grade Separation	65.00	2
Craney Island Access Road	65.00	2

Figure 13 – "Intermodal" Tool Validation Results for Project Utility

Project Name	Viability Grade
Intermodal Connector + Chambers Interchange (I-564)	B
Terminal Boulevard Grade Separation	E
Craney Island Access Road	E

Figure 14 – "Intermodal" Tool Validation Results for Project Viability

For the final category, "Intermodal," the highest utility score and viability grade belong to the Intermodal Connector and Chambers Interchange (I-564), which also is the final major project of the initial list of 14. The other two projects (Terminal Boulevard Grade Separation and Craney Island Access Road) receive identical scores of 65.00. All three projects have the potential to gain an additional 25 points when an ultimate *Cost Effectiveness* MOE is developed. Currently, this criterion is measured by the ratio of revenue increase to overall cost of the project. However, since revenue increase projections could not be obtained, the 25 points for *Cost Effectiveness* were not allocated to any of the "Intermodal" tool validation projects.

I.3 Tool Validation Findings

The tool validation analysis enabled stakeholders to observe the validity of the proposed project categories, evaluation criteria, weighting factors, and MOEs for both the project utility and project viability components. From the analysis, it was evident that the six project categories and their associated evaluation criteria, weighting factors, and MOEs were valid, reliable, and able to differentiate a wide spectrum of pertinent projects for the project utility and project viability components. The "Highways" category in particular supports this conclusion, since projects within the same roadway system (Interstate, Primary, Secondary, Urban, or Other) received similar overall scores. Additionally one of the two most viable "Bridge/Tunnel" projects known to stakeholders, the Midtown Tunnel/MLK Extension, ranked first in project viability and third in project utility. These observations reinforce the conclusion that the most important project characteristics within each category are being adequately considered and scored. The additional sorting of the "Highways" and "Bridge/Tunnel" categories by individual criterion also was observed to support the same conclusions.